

UNITED STATES. CIRCUIT COURT. DISTRICT OF  
NEW JERSEY.

American Graphophone Company	} In Equity } No.
versus	
United States Phonograph Company	} on patents } 341,214 & } 341,288
& George E. Tewksbury	

1898-1899

R. R. Wile  
1973-75

U. S. Circuit Court. District of  
New Jersey.

American Graphophone Co. )

versus

United States Phonograph Co.)  
& George E. Tewksbury

In Equity

on patents  
341,214 &  
341,288

RECORD (INCOMPLETE)

1897-1900.

Electrostatic copies  
from Edison National  
Historic Site &  
Inclusion Section - FRC -  
Bayonne, N.J. (RG 21)



American Graphophone Co. vs. U. S. Phonograph Co. & George E. Tewksbury on Patents nos. 341,214 & 341,288 (See also companion case on patent 341,287. Evidence admissable in either case.)

Bill of complaint 12/22/97

Stipulation (Amending answer by adding paragraph 22)

In proceedings on motion for preliminary injunction.

- A. Affidavit of Howard W. Hughes May 25, 1898.  
(Includes discontinuance of previous case 12/10/96 & The motion denying a preliminary injunction in that case)
- B. Affidavit of William B. Vansize May 25, 1898
- C. Affidavit of H. Albertus West May , 1898.

Brief for Defendant on motion for preliminary injunction

Supplemental brief for complainant on motion May 27, 1898

Transcript of shorthand reports of arguments taken on the above stated cause on a motion for a preliminary injunction, May 27, 1898. (Mauro, Edmonds, Hayes, Mitchell) Bound separately.

Testimony of Shelton T. Cameron June 23, 1898 - June 24, 1898

Testimony of Philip Mauro June 24, 1898.

Stipulation

Testimony of John C. English 9/30/98

Petition

Order to show cause - Judge Kirkpatrick 1/23/99

- a) Affidavit of Edward D. Easton Jan. 20, 1899
- b) Affidavit of Philip Mauro Jan. 20, 1899.

Deposition of J. Henry Clark, Police Surgeon 6/19/99

Deposition of Frank L. Capps 6/19/99

Stipulation

Proofs in reply

Shelton T. Cameron 7/11/99-9/29/99

Edward D. Easton 9/6/99

Certification of Incorporation American Graphophone Co.  
Columbia Phonograph Co.  
Columbia Phonograph Co., Genl.



UNITED STATES CIRCUIT COURT  
DISTRICT OF NEW JERSEY

American Graphone Company

vs.

United States Phonograph  
Company and George E. Tewks-  
bury

BILL OF COMPLAINT.

(Patents Nos. 341,214 and  
341,288)\*

Anthony Pollok  
Philip Mauro,  
of Counsel

Filed Dec. 22, 1897

Law Offices,  
Hayes & Lambert,  
Newark, N.J.

ROOM 508, PRUDENTIAL BLDG.  
765 BROAD STREET.

U. S. LAW BLANK & STATIONERY CO. 359 W. BROADWAY, N. Y.  
SUCCESSORS TO J. V. JONNISON & CO.



In the United States Circuit Court.

For the District of New Jersey.

Bill of Complaint.

To the Honorable the Judges of the Circuit Court of the  
United States for the District of New Jersey.

The American Graphophone Company, a corporation duly organized and existing under the laws of the State of West Virginia, and having its principal office in Washington, in the District of Columbia, brings this, its bill of complaint, against The United States Phonograph Company, a corporation organized and existing under the laws of the State of New Jersey and having its principal place of business at Newark in said State, and George E. Tewksbury, individually and as Manager of said Company, said Tewksbury being a resident of Newark aforesaid, and both said United States Phonograph Company and George E. Tewksbury being inhabitants of the said District of New Jersey.

1.

And thereupon your orator complains and says that  
<sup>A-</sup>Chichester A. Bell and Sumner Tainter, then of Washington, aforesaid, were the original, first and joint inventors of certain new and useful improvements in recording and reproducing speech, and other sounds, which were not known or used by others in this country, or patented or described in any printed publication in this or any foreign country prior to their invention thereof, and which had not been in public use or on sale in the United States for more than two years prior to their application for letters patent therefor, and which had not been abandoned to



the public;

That on the 27th day of June, 1885 the said Chichester A. Bell and Sumner Tainter made application in due form of law to the Commissioner of patents for the grant of Letters-Patent of the United States for the said inventions and then and there fully complied in all respects with the provisions and requirements of the laws of the United States in such case made and provided.

That, due proceedings being had upon said application upon the 4th day of May, 1886, letters patent of the United States, in due form of law, were issued and delivered to said Chichester A. Bell and Sumner Tainter, in the name of the United States, under the seal of the Patent Office, and signed and countersigned respectively by the proper officers of the United States, and numbered 341,214 granting to said Chichester A. Bell and Sumner Tainter, their heirs or assigns, for the term of seventeen years from said 4th day of May, 1886, the full and exclusive right to make, use and vend the said inventions throughout the United States and Territories thereof, as by reference to said Letters-patent, or a duly authenticated copy thereof, here in court to be produced will more fully and at large appear.

That the said Sumner Tainter was further the original first and sole inventor of a certain new and useful improvement in apparatus for recording and reproducing sounds or sonorous vibrations, not known or used by others in this



country, or patented or described in any printed publication in this or any other foreign country, prior to his invention thereof, and not in public use or on sale in the United States for more than two years prior to his application for letters patent therefor, and which had not been abandoned to the public;

That on the 4th day of December, 1885, said Sumner Tainter made application in due form of law to the Commissioner of Patents for the grant of letters patent of the United States for said invention, and then and there fully complied in all respects with the requirements and provisions of the laws of the United States in such case made and provided.

That, due proceedings upon said application being had upon the 4th day of May, 1886, letters patent of the United States in due form of law were issued and delivered to said Sumner Tainter, in the name of the United States under the seal of the Patent Office, signed and countersigned respectively by the proper officers of the United States, and numbered 341,288 granting to said Sumner Tainter, his heirs or assigns, for the term of seventeen years from said 4th day of May, 1886, the full and exclusive right to make, use, and vend the said invention throughout the United States and the Territories thereof, as by reference to said letters patent, or a duly authenticated copy thereof, here in court to be produced, will more fully appear.

That the inventions or improvements described and claimed in said patent to Sumner Tainter were designed for and are capable of use conjointly, and are used conjointly with the improvements or inventions described and claimed in



the patent aforesaid to Bell and Tainter, in recording and reproducing sounds.

And your orator further shows that on the 29th day of March, 1887, said Chichester A. Bell and Sumner Tainter, by an instrument in writing, duly signed, delivered and recorded in the United States Patent Office the 22nd day of September 1887, did give, grant, and convey to The Volta Graphophone Company, a corporation organized and existing under the laws of the States of Virginia, its successors or assigns, the entire right, title and interest in and to said Letters Patent No. 341,214 granted to them as aforesaid, and in and to the invention secured thereby as by reference to said instrument, or to a duly authenticated copy thereof, here in court to be produced will more fully and at large appear.

That on the 29th day of March, 1887, said Sumner Tainter, by an instrument in writing duly signed and delivered and recorded in the United States Patent Office the 5th day of April, 1887, did give, grant, assign and convey to the said The Volta Graphophone Company, its successors and assigns, the entire right, title and interest in and to said letters-patent No. 341,288 granted to him as aforesaid, and in and to the invention secured thereby, as by reference to said instrument or a duly authenticated copy thereof, here in court to be produced, will more fully and at large appear.

That on the 24th day of January, 1893, the said The Volta Graphophone Company, by an instrument in writing, duly signed, sealed and delivered, and recorded in the United States Patent Office the 25th day of January, 1893, did give,



grant, assign and convey to your orator, its successors or assigns, the entire right, title and interest in and to said letters patent No. 341,214 and No. 341,288 and in and to the inventions secured thereby, as by reference to said instrument or a duly authenticated copy thereof here in court to be produced will more fully and at large appear.

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That your orator has been, since the date of the assignment last mentioned, and is now the owner of the said letters patent, and each of them, and of the rights and privileges secured thereby, and has been and is, save for the doings of these defendants and others acting in concert with them, in the exclusive possession of said rights and privileges, and is entitled to the entitled to the exclusive use, benefits and advantages of the said inventions and improvements.

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And your orator further shows that the said inventions and improvements are of great commercial value and practical utility; that a great public interest has been manifested therein, and a large demand created for apparatus constructed in accordance with or embodying the same, which demand your orator is ready and able to supply.

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And your orator further shows, (upon information and belief, that the defendants, and each of them, and others acting in concert with them, well knowing the premises, since the grant of said letters patent, and since the date of the assignment last mentioned, within the District of New Jersey and elsewhere in the United States, wrongfully, unlawfully, and with intent to injure your orator, and to



deprive it of the just profits resulting from said inventions and without the license or consent of your orator, have manufactured, sold and used, <sup>reproduced</sup> sound records substantially as described in said letters patent, and particularly such as pointed out in claims numbered 7, 8, ~~10~~, 17 and 18 of patent No. 341,214 and claim 37 of patent No. 341,288 thereby infringing the exclusive rights of your orator, and have derived and still are deriving and receiving great gains and profits from such unlawful use, but to what extent your orator is ignorant and can not set forth.

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And your orator further shows that in February, 1893 it filed its bill of complaint in the Circuit Court of the United States for the District of New Jersey against the Edison Phonograph Works, for infringement of patents Nos. 341,214 and 341,288 here in suit, by the manufacture, sale and use of machines for recording and reproducing sounds, known as "Phonographs", and of tablets and sound records for use therewith, and that on or about the 10th day of December, 1897, a final decree was entered in said cause, by consent sustaining said patents and each of them and finding that the defendant had infringed the same.

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And your orator further shows that on the 21st day of January, 1896 it filed its bill of complaint in the Circuit Court of the United States for the Northern Division of the Northern District of Illinois against Edward H. Amet, for infringement of patent No. 341,214 here in suit, by the manufacture, use and sale of machines for reproducing sounds, then known as the "Amet" machine, than an answer was filed by the defendant, and that the cause went to final hearing



upon the pleadings and upon proofs in the form of affidavits before the Honorable Peter S. Grosscup, District Judge, and was fully argued by counsel for both sides; that on the 6th day of April, 1896, an opinion was filed by Judge Grosscup, sustaining said patent and finding that the defendant had infringed the same; that on the 4th day of May, 1896, a decree was entered in conformity with said opinion for a perpetual injunction against the said defendant, and for an accounting of damages, profits and costs, which decree, by an order dated January 4th 1897, was confirmed and made absolute

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And your orator further shows that in March, 1897, it filed its bill of complaint in the Circuit Court of the United States for the Northern Division of the Northern Judicial District of Illinois against the National Ediphone Company and David E. Boswell, individually and as President of said National Ediphone Company, for infringement of patent No. 341,214 here in suit, by the manufacture, use and sale of a machine for recording and reproducing sounds, then known as the "Ediphone"; that on April 7th, 1897, a final decree was entered and a perpetual injunction ordered against David E. Boswell, and an order for a preliminary injunction entered therein against the National Ediphone Company.

-17- 12

And your orator further shows, upon information and belief, that your orator, and all persons making under authority of your orator, apparatus for recording and reproducing sounds and sound records, employing, embodying, and operating or made in accordance with your orators said inventions, described and claimed in the letters patent



aforesaid, have given notice to the public that the same are patented, and have affixed thereto the word "patented" together with the day and year the said patent was granted.

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And your orator therefore prays as follows:

(1) That the said defendants, and each of them, be required by a decree of this Honorable Court to account for and pay over to your orator such gains and profits as have accrued or arisen, or been earned or received by the said defendants and each of them, and all such gains and profits as would have accrued to your orator but for the unlawful doings of said defendants, and all damages your orator has sustained thereby; and

(2) That the defendants, and each of the, be compelled by an order of this Court, to deliver up to you orator to be destroyed, all the infringing <sup>phonograph</sup> sound records in their or each of their possession.

(3) That the defendants and <sup>in</sup> each of them their associates, attorneys, servants, clerks, agents, and workmen, may be perpetually enjoined and restrained, by a writ of injunction issuing out of and under the seal of this Honorable Court, from directly or indirectly making or causing to be made, using or causing to be used, selling or causing to be sold, any machines or apparatus embodying or constructed or operating in accordance with the inventions or improvements set forth in the letters patent aforesaid, or either of them; and

(4) That your Honors will grant unto your orator a preliminary injunction, issuing out of and under the seal of this Honorable Court, enjoining and restraining the said defendants, and each of them <sup>in</sup> their associates, servants,



clerks, agents and workmen, to the same purpose, tenors and effect as hereinbefore prayed for with regard to said perpetual injunction; and

(5) That these defendants be decreed to pay the costs of this suit; and

(6) That your orator may have such other and further relief as the equity of the case may require.

To the and therefore, that the said defendants may, if <sup>it</sup> they can, show why your orator should not have the relief hereby prayed, and may full, true and direct answer make, but not under oath, answer under oath being expressly waived, according to the best and utmost of their knowledge, information, remembrance, and belief, to the ~~severall~~ matters hereinbefore averred and set forth, as fully and particularly as if the same were repeated, paragraph by paragraph, and said defendants thereto severally and specifically interrogated, may it please your Honor to grant to your orator a writ of subpoena ad respondendum issuing out of and under the seal of this Honorable Court, directed to said defendants the United States Phonograph Company, and George E. Tewksbury, and each of them, commanding them to appear and make answer to this bill of complaint, and to perform and abide by such orders and decree herein as to this court may seem just.

And your orator will ever pray.

Pollok & Mauro

American Graphophone Co.

Solicitors for Complt.

By E.D. Easton,

Anthony Pollok

President,

Philip Mauro,

(L.S.)

of Counsel



City, County and State of New York, S S:

On the 17th day of December 1897, before me personally appeared Edward D. Easton, and being duly sworn, did depose and say that he is the President of the American Graphophone Company, named as complainant in the foregoing bill of complaint; that he has read the same and knows the contents thereof, and that the same is true of his own knowledge, except as to matters therein stated upon information and belief that as to such matters he believes it to be true, and that the seal affixed to said bill is the corporate seal of said complainant, and was by him affixed by authority of said corporation.

( L.S. )

Gilford Murry,

Notary Public,

N.Y. No. 95.



UNITED STATES OF AMERICA :  
: SS  
DISTRICT OF NEW JERSEY :

I, S.D. OLIPHANT, Clerk of the Circuit  
Court of the United States, for the District of New Jersey,  
in the Third Circuit; do hereby certify that the foregoing  
to be a true copy of the original  
Bill of Complaint

on file, and now remaining among the records of the said  
Court in my office.

( S E A L )

IN TESTIMONY WHEREOF, I have  
subscribed my name and affixed  
the Seal of the said Court at  
Trenton, in said District, this  
Fourth day of January, in the  
year of our Lord one thousand  
eight hundred and ninety-eight  
and of the Independence of the  
United States the one hundred  
and twenty-second.

S.D. OLIPHANT,

Clerk of Circuit Court  
U.S.



UNITED STATES CIRCUIT COURT,  
District of New Jersey.

AMERICAN GRAPHIC  
COMPANY,

-VS-

UNITED STATES PHOTOGRAPH  
COMPANY AND GEORGE E. LITTLE-  
BURY.

STIPULATION.

HAYES & JENNINGS,

Solicitors.



UNITED STATES CIRCUIT COURT,

District of New Jersey.

AMERICAN GRAPHOPHONE COMPANY :  
:   
-VS- :  
: IN EQUITY  
UNITED STATES PHONOGRAPH COMPANY :  
: STIPULATION.  
AND GEORGE E. TEWKSBURY. :

Consent hereby is given to the defendant United States Phonograph Company to amend its answer filed in the above cause, by adding as paragraph twenty-two, the following:

"XXII. That on the thirteenth day of October, eighteen hundred and ninety-four, the said complainant filed a bill of complaint in this court against this defendant and others, alleging that this defendant had infringed patents of the said complainant numbers 341,214 and 341,298, by making, using and selling sound records in the same manner and of the same kind as are complained of in its bill of complaint in this suit; that on the third day of December, eighteen hundred and ninety-four this defendant filed an answer to said bill of complaint, denying the validity of said patents and denying that it had made, used or vended the said sound records without the license of the said complainant; that a replication was filed by said complainant to said answer and proofs in the said cause were taken and completed by both parties and the cause set down for final hearing in this court; that said proof showed that this de-



fendant was engaged in making and vending sound records of the same character as are complained of in the complainant's bill of complaint in this cause; that after the said cause was at issue and set down for final hearing, a decree was entered in said cause by the consent of the complainant discontinuing the said suit; that the purpose of the parties to said suit in the entry of said decree was to settle the matter in difference between this defendant and the said complainant, and to assure to this defendant the right to continue making and vending such sound records in the manner theretofore pursued by this defendant; that this defendant has from that time continued to make and sell sound records of the same character and in the same manner as theretofore, and of no other character and in no other manner. And this defendant charges and insists that the said decree estopps the complainant from objecting to such making and vending of such sound records on the part of this defendant"



UNITED STATES CIRCUIT COURT.

DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

*Plaintiff,*

*vs.*

UNITED STATES PHONOGRAPH COMPANY

*et als.,*

*Defendants.*

*In Equity.*

AFFIDAVIT OF HOWARD W. HAYES.

STATE OF NEW JERSEY, }  
COUNTY OF ESSEX, } *ss. :*

Howard W. Hayes, being duly sworn according to law, on his oath says: I am one of the solicitors of the United States Phonograph Company in the above suit. I was one of the solicitors for the defendants in the suit brought in this Court by the American Graphophone Company against the United States Phonograph Company, George E. Tewksbury and Victor H. Emerson, in which the bill was filed October fifteenth, eighteen hundred and ninety-four. I was also one of the counsel in the case brought in this Court by the American Graphophone Company against the Edison Phonograph Works. Both of these cases were combined and argued at the same time upon the same evidence, except that in the case against the United States Phonograph Company admissions were agreed upon by counsel which eliminated some of the features in the other case. At the time these suits were pending extended litigation was going on between the American Graphophone Company, on one side, and the Edison Phonograph Company and the North American Phonograph Company, on the other, on the patents owned or controlled by them respectively. The United States Phonograph Company was a large dealer in Edison phonographs and in records, original and duplicate, made on Edison blanks, and therefore it also was sued. One of the features in the two cases was the contractual relations that had existed between the American Graphophone Company and Jesse H. Lippincott and the North American Phonograph Company, by reason of which it was claimed that the Edison Phonograph Works had an implied license under the graphophone patents. There was also evidence tending to show that all of the phonographs made by the Edison Phonograph Works had been made for the North American Phonograph Company and that Jesse H. Lippincott had paid the American Graphophone Company a licensee fee for each one. In the case against the Edison Phonograph Works this fact was disputed; but in the case against the United States Phonograph Company it was admitted that all the phonographs used or sold by that company had been duly licensed by the American Graphophone Company. It was not claimed, however, that the blanks used by the United States Phonograph Company, all of which it purchased from the Edison Phonograph Works, had paid any license fee. The main business of the United States Phonograph Company was the making and selling of musical or talking records to be used on phonographs.

The issues raised in the case against the Works were:

1. Whether the cutting or engraving method was new or patentable at the time the Bell and Tainter patents were issued.



2. Whether the soap blank of Edison is an equivalent for the wax blank of Bell and Tainter; this point involving the question as to whether Bell & Tainter's claims should have a broad interpretation.

3. Whether the Works had an implied license under the graphophone patents.

A large mass of testimony was taken on these points covering the whole history of the art.

In the case against the United States Phonograph Company the only question arising was as to whether that company had a right to make and sell records on Edison blanks in the manner it had all along been pursuing. That, of course, covered the first two questions above mentioned, but eliminated the third.

The evidence in the case against the Works was stipulated into the case against the United States Phonograph Company and the two cases were argued at the same time on the same evidence. I now quote so much of that stipulation in the case as refers to the phonographs owned by the United States Phonograph Company.

"It is hereby stipulated and agreed, by and between counsel for the respective parties, for the purposes of this suit, and for no other purpose, as follows :

\* \* \* \* \*

"Defendants' counsel admit that the defendant company is a manufacturer of, and dealer in, musical and talking records for the phonograph, and is a corporation organized under the laws of the State of New Jersey, doing business in Newark in said State, and that the defendant, Victor H. Emerson, is the president of said company, and the defendant, George E. Tewksbury, is the treasurer of said company, and that said Emerson and Tewksbury reside at said Newark.

"Defendants' counsel further admit that the defendant company made, used and sold, at Newark, N. J., prior to the filing of the bill of complaint herein and subsequent to January 25, 1893, sound-records similar to the sound-record marked "Complainant's Exhibit Defendants' Sound-Record," and in the making of such records the defendant company used blanks similar to the blank marked "Complainant's Exhibit Defendants' Blank," and that the defendant company in the manufacture of such records from such blanks used phonographs similar in all respects to the phonograph marked "Complainant's Exhibit Modern Phonograph."

"Complainant's counsel admit that the phonographs used by the defendant company in the making of the sound-records were purchased by the defendant company from the New Jersey Phonograph Company, and that such machines were purchased by the New Jersey Phonograph Company from the North American Phonograph Company prior to April 30th, 1891, under an agreement between said last-named companies dated February 19th, 1889, a copy of which is marked in this case "Defendants' Exhibit, New Jersey Phonograph Company. Agreement," and under the authority of Jesse H. Lippincott, then sole licensee of the complainant under the three contracts between said Lippincott and the complainant, dated respectively March 26th, 1888, August 6th, 1888, and August 6th, 1888, copies of



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which are marked in this case "Complainant's Exhibit, Lippincott Agreement of August 6th, 1888," "Complainant's Exhibit, Lippincott Agreement of August 6th, 1883," and "Complainant's Exhibit, Lippincott Supplemental Agreement of August 6th, 1888;" and that the royalty provided to be paid in said supplemental agreement upon such phonographs owned and used by defendants as aforesaid, was either actually paid by said Lippincott to complainant or chargeable to him on the accounts between the complainant and said Lippincott. Formal proof of said four agreements is hereby waived, subject to the correction of errors. And it is stipulated by the parties that said Lippincott, on May 1st, 1891, made a general assignment for the benefit of his creditors, and that he died about June, 1894.

"Complainant's counsel further admit that the blanks upon which the defendant company has made its records have been obtained by the defendant company from time to time from the said New Jersey Phonograph Company, and are blanks manufactured by the Edison Phonograph Works and sold by said Edison Phonograph Works to the North American Phonograph Company, and by said latter company sold to the New Jersey Phonograph Company under the agreement between the New Jersey Phonograph Company and the North American Phonograph Company before referred to, and that the defendant company makes the records referred to from such blanks, and sells such records at Newark, New Jersey, with the knowledge and consent of the New Jersey Phonograph Company.

"It is stipulated by the parties that such phonograph blanks are articles of daily manufacture and have been purchased by the defendant company in the manner indicated from time to time, down to the filing of the bill of complaint herein.

"Complainant's counsel, in view of their admission, touching the specific phonographs in the hands of the defendants, give notice that the complainant does not charge infringement in respect of such machines used by the defendant company, but confines its charge of infringement herein to claims 1, 7, 8, 9, 10, 12, 15, 16, 17, 18 and 45 of patent No. 341,214, and claims 1, 4 and 37 of patent No. 341,288.

I spent at least two weeks in the preparation of my brief in the case. The two cases were argued at the same time before the late Judge Green, but he died before deciding them. The two rival interests then came to an agreement and a treaty was arrived at by which it was arranged that each interest should have a license under the patents of the other in suit; and also that any article that had theretofore been put out commercially by either party, was licensed thereafter to be made and sold. The following is the language of the agreement.

"MEMORANDUM OF AGREEMENT made this seventh day of December, 1896, between American Graphophone Company, a West Virginia corporation, having its principal place of business at Washington, D. C., hereafter referred to as the Graphophone Company, party of the first part, and the National Phonograph Company and the Edison Phonograph Works, New Jersey corporations, having their principal place of business at Orange, New Jersey, and herein-



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after collectively referred to as the Phonograph Companies, parties of the second part.

"Whereas, the Graphophone Company and the Phonograph Companies are manufacturers of talking machines and supplies therefor, and respectively own various letters patent relating thereto, which each interest claims are infringed by the other interest; litigation on said patents has been in progress for some time and is undecided; and it seems probable that the patents of both interests will be finally sustained by the courts; and whereas it is believed by the parties that no commercially competitive machine can be manufactured without infringing the patents of both interests;

"And whereas, in view of the foregoing and other considerations, the two interests have concluded to exchange licenses and put an end to the large expense of continuing the pending litigation.

"Now therefore, it is agreed as follows:

"1. The Graphophone Company hereby grants the National Phonograph Company the right and license to manufacture and sell talking machines and supplies therefor under patents No. 341,214, granted May 4, 1886, to Bell & Tainter, and No. 341,288, granted on same date to C. S. Tainter, to the full end of the terms thereof.

"2. The Phonograph Companies hereby grant to the Graphophone Company the right and license to manufacture and sell talking machines and supplies therefor under the following patents granted upon inventions of Thomas A. Edison, to the full end of the terms thereof, to wit: Nos. 382,416, granted May 8, 1888; 382,418, granted May 8, 1888; 362,462, granted May 8, 1888; 386,974, granted July 31, 1888; 393,966, granted December 4, 1888; 393,967, granted December 4, 1888; 393,968, granted December 4, 1888; 400,648, granted April 2, 1889; 400,647, granted April 2, 1889; 400,648, granted April 2, 1889; 414,761, granted November 12, 1889; 430,274, granted June 17, 1890; 430,278, granted June 17, 1890; 484,583, granted October 18, 1892; 484,584, granted October 18, 1892; and 499,879, granted June 20, 1893.

"3. The licenses granted by sections 1 and 2 are not exclusive, and are not transferable. It is also understood that no license is intended to be granted by either interest to the other under any patent not specified in sections 1 and 2, the intention being to maintain the present characteristic differences between the machines of the two interests. It is also agreed that the Graphophone Company will not apply to any talking machines which it puts out the trade-name "phonograph," and that the Phonograph Companies will not apply to any talking machines which they put out the trade-name "graphophone." It is further agreed that neither interest will bring suit against such types of apparatus or supplies as have been put out commercially by the other interest before the date of this contract, whether put out by either interest before or after this contract.

"4. The parties agree to co-operate in sustaining all the patents hereinbefore specified, and in proceeding against all third persons who may infringe such patents, or any of



5-  
them. If suit be brought under a graphophone patent, the Graphophone Company shall bear the expense, but the Phonograph Companies shall have the right to be represented by their counsel in such suit at their own expense, and *vice versa*; the Phonograph Companies shall bear the expense of suits brought under their patents, subject to the right of the Graphophone Company to be represented by its counsel at its expense. If either party desires a suit brought under a patent of the other, and such other for any reason declines to prosecute, the party desiring such suit shall have the right to use the name of the other party for the purposes thereof.

"In witness whereof, the parties hereto have caused these presents to be signed and sealed the day and year first above written, each by its president thereunto duly authorized.

AMERICAN GRAPHOPHONE COMPANY,

Attest: By E. D. Easton, *President*.

Paul H. Cromelin, *Secretary*.

EDISON PHONOGRAPH WORKS,

Attest: By Thomas A. Edison, *President*.

J. F. Randolph, *Secretary*.

NATIONAL PHONOGRAPH COMPANY,

Attest: By W. S. Mallory, *President*.

J. F. Randolph, *Secretary*."

Copies or "duplicate" records had been put out commercially by the North American Phonograph Company and the United States Phonograph Company long before this treaty was made.

The National Phonograph Company mentioned in the agreement then owned or controled all the Edison patents and was Mr. Edison's selling company. At the same time that this treaty was arranged, it was provided, as is usual in such settlements, that decrees by consent should be taken against the defendants in the various suits between the graphophone interests and the Edison interests. But as the United States Phonograph Company was not directly a party to the treaty, but was the principal dealer in this country in original and duplicate records made on Edison blanks, it was agreed that the suit against it should be discontinued. The negotiations for the settlement were carried on by Messrs. Dyer & Driscoll on behalf of the Edison interests and the United States Phonograph Company, but before a final agreement was arrived at, the terms of the settlement were submitted to Mr. Tewksbury and myself. I had a conference with Messrs. Dyer & Driscoll about it, and was told by them that the settlement involved default decrees in the other suits and a discontinuance of the suit against the United States Phonograph Company. My understanding was that such a discontinuance was in effect a decree in favor of the United States Phonograph Company permitting it to carry on its business as theretofore, and so advised that company's officers.

Viewing the decree of discontinuance in the suit against the United States Phonograph Company merely from the face of the record, it may be considered an adjudication by consent that the Bell & Tainter patents, covering an engraved record are invalid as against that company.



6

In support of the positions above taken, I quote extracts from the brief for the complainant used at the argument of that case before Judge Green.

"The bill charges infringement of Letters Patent No. 341,214 issued to C. A. Bell and Sumner Tainter, and No. 341,288 issued to Sumner Tainter, both bearing date May 4, 1886. Complainant's title to these patents is admitted. (Stipulation p. 53.)

"The same patents are involved in a suit brought by this complainant against the Edison Phonograph Works. It has been agreed by counsel that the two cases shall be tried together, the proofs in one being stipulated into the other.

"Nearly all the claims, of which infringement is here alleged, are also involved in the Edison Phonograph Works' case, and the issues of validity and infringement are fully treated in our brief in that case, and need not here be discussed.

"In the present case it is stipulated that the defendants are manufacturers of, and dealers in, musical and talking records for the phonograph, and that in the manufacture of the sound-records they use blanks similar to "Complainant's Exhibit Defendants' Blank," and that in making these records they use phonographs purchased from a licensee of the North American Phonograph Company, as to which specific instruments it is stipulated that the royalty provided to be paid therefor to complainant by Jesse H. Lippincott, its then sole licensee, was either actually paid to complainant by said Lippincott, or was chargeable to him on accounts between them. (Stipulation p. 53.)

\* \* \* \* \*

"Defendants' intention is to contend that they have the right to use their licensed machines in the manufacture of sound-records, and have the right to sell and use such sound-records, notwithstanding that the manufacture of such articles involve not merely the use of licensed devices, but also the use of unlicensed devices. The merit of this contention of defendants is the principal question in the case.

\* \* \* \* \*

"In addition to this inadmissible defence of license to use the subject-matter of all claims for the sound-records and for the method of making them, several other defences are presented by the proofs. These are :

"1. That claims 1 and 4 of the second patent, which defendants dispute, are anticipated by certain prior patents and publications, and by experiments of Thomas A. Edison,

"2. That defendants' blank does not infringe these claims.

#### **The Special Claims Infringed.**

"Defendants, in making their sound-records, use certain machines which (as was sworn to in the preliminary injunction motion herein) have already paid to complainant the royalty provided in the Lippincott agreement or for which royalty Lippincott was responsible. Complainant, therefore, has limited its charge of infringement and its claims of recovery to the blanks, sound-records, and the method of converting the blanks into sound-records, it being admitted that the blanks and sound-records were not made by or for complainant's former licensee. (Stipulation p. 53.)

\* \* \* \* \*



"Claims 1 and 9 point out, the former broadly, the latter more specifically, the art or method now in universal use for making records of sound available for immediate reproduction, the distinguishing feature of that method being "impressing the sonorous vibrations upon a style, and thereby cutting in a solid body the record corresponding in form to the sound waves."

"Claims 7 and 8 specify the new product of this method, to wit: the sound-record, whose distinguishing features are that it is a tablet or solid body, having its surface cut or engraved with lines of irregular or varied form, corresponding to sound waves.

"The foregoing claims are fully discussed in our brief in the "Works" case, and it will be admitted that their subject-matter is employed in all phonographs and graphophones.

"Claim 10 is a more limited claim for the sound-record, specifying that it is cut or engraved in wax, or a wax-like composition. The compositions in use at the present day are wax-like in every particular material to the operation of engraving a sound-record, as is shown by the evidence and argument in the "Works" case.

"Claim 12 specifies "a wax-like composition, such as the compound of beeswax and paraffine." The defendants' composition is the equivalent of the compound of beeswax and paraffine, being used in the same manner, and to produce the same result.

"Claims 15 and 16 read as follows :

"15. The method of making a sound or speech record, which consists in engraving or cutting in the recording material an irregular groove with sloping walls, the shape of the groove representing the sound vibrations, substantially as described."

"16. The method of making a sound or speech record which consists in cutting in the recording material a groove with sloping walls, and of variable cross-section, the variations corresponding in form to sound waves, substantially as described."

"The particular merit of cutting the record in the form of a groove with sloping walls, is that thereby the freely mounted, or gravity reproducer, is automatically guided and kept in contact with the record in the bottom of the groove.

"Claims 17 and 18 are for the sound-record, in the form of an irregular groove, with sloping walls, cut in solid material, and call for no separate discussion.

"Claim 45 is for the sound record, consisting of a wax or wax-like tablet, having engraved therein a spiral line, with inequalities or irregularities corresponding in form to sound waves.

"As already stated, there is no denial in this case that the defendants employ, in making sound records for sale and use, the subject-matter of all the foregoing claims.

"One machine can be used in making hundreds of thousands of such records and still its capacity for work would remain. They can be made by duplication, without using the machine at all.

\* \* \* \* \*

"Plainly, the purpose of the stipulation was to simplify the issues by excluding from the consideration of the Court in this case the question whether machines like those owned by the defendant would infringe certain claims which relate



to mechanical devices, and to confine the case to those claims which relate to what constitute the real business of the defendants, namely, making and selling sound-records.

\* \* \* \* \*

"The sound-record in evidence may have been made with an Edison phonograph or with a chisel. It is a matter of absolute indifference under the issues in this case. The Court has simply to inquire whether the "Exhibit, Defendants' Sound Record," was made in accordance with the claims for the patented method, and embodies the inventions of the product claims. As to this, and as to the validity of those claims, there is no dispute.

\* \* \* \* \*

"It may turn out that many of the defendants' sound-records were not made by the aid of phonographs at all. Most of the sound-records of commerce are made by the process of "duplicating," that is, copying from a master record, and while this fact does not appear from the evidence in the case, it may be referred to for the purpose of illustrating the argument. In such case it is clear that the defendants' contention would fail, and that the sound records, even in their view of this question, would be infringing devices, subject to accounting."

I have annexed to this affidavit a copy of Judge Green's memorandum denying the motion for a preliminary injunction in the case, and also a copy of the order of discontinuance. I also refer to, as exhibits, in connection with this affidavit, the record, testimony and depositions in that case.

Sworn to and subscribed this }  
25<sup>th</sup> day of May, 1898, }  
at Newark, before me,

Howard W. Hayes

F. B. Stewart  
Notary Public  
New Jersey

in the final hearing and motion for preliminary injunction.



UNITED STATES CIRCUIT COURT.

DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

vs.

UNITED STATES PHONOGRAPH COMPANY,  
et al.

*In Equity.*

Dec. 10, 1896.

On consent of the solicitors for the respective parties hereto, it is hereby

ORDERED, that this suit be and the same hereby is discontinued, without costs to either party as against the other.

ANDREW KIRKPATRICK,  
*Judge.*

Entry and filing of above order consented to.

LEE & LEE,  
*Solicitors for Complainant.*

By POLLOK & MAURO,  
*of Counsel.*

HOWARD W. HAYES,  
*Solicitor for Defendants.*

By DYER & DRISCOLL,  
*of Counsel.*

UNITED STATES CIRCUIT COURT.

DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

vs.

UNITED STATES PHONOGRAPH COMPANY.

Memorandum.

The motion for preliminary injunction is denied.

EDW. T. GREEN, J.



United States Circuit Court,  
District of New Jersey.

American Graphophone Com-:

pany,

Pltff.,

-vs-

United States Phonograph  
Company et als.,

Deft's.

Affidavit of  
H. Albertus West.



UNITED STATES CIRCUIT COURT.

District of New Jersey.

American Graphophone Company, :  
 :  
Plaintiff, :  
 :  
-vs- : In Equity.  
 :  
United States Phonograph Com- :  
pany et al., :  
 :  
Defendants. :

City, County and State :  
 :ss.  
of New York. :

H. Albertus West being duly

sworn according to law on his oath says: I am the solicitor and counsel of Cleveland Walcutt and Edwin F. Leeds, and of the corporation Walcutt & Leeds, Limited, in the suits brought against them respectively by the American Graphophone Company on patents Nos. 314,214 and 314,283. Those suits were practically the same. The first suit was against Mr. Walcutt and Mr. Leeds as a partnership, and the suit against the corporation was similar in character. Walcutt and Leeds incorporated their business for the purpose of raising money to extend it, and the decree against them individually was followed as a matter of course by a similar preliminary injunction against the corporation. Judge Lacombe based his decision entirely on Judge Wheeler's decree. At the time he settled his decree, he said he would "confine it to the four corners" of Judge Wheeler's decree. I interposed no objection to such a decree against the corporation, as the business of the corporation was the



same as the business formerly carried on by the partnership, and there was no intention either on my part, or on that of either Mr. Walcutt or Mr. Leeds, to attempt to avoid the effect of the decree in the first suit.

That suit was founded on the claims of two Graphophone patents, 341,214 and 341,288 that were claimed to cover a cut or engraved record in a wax or wax-like substance as a product. Messrs Walcutt and Leeds in their business dealt in phonographs and graphophones and supplies and musical records. All their machines were either purchased from the Graphophone Company or the National Phonograph Company, which has a license under the said patents. Some of the records sold by them were made by means of sound waves directly impinging on the diaphragm of the phonographs and so recorded on the metallic soap blanks purchased by them from the National Phonograph Company, and others were made by copying the indentations of such records upon other blanks mechanically. The suit was brought to enjoin the defendants therein from making and selling the so called duplicates. Correctly speaking, they are not duplicates, but copies, and are not sound records. They are copies of the indentations produced by sound waxes on the original record. In making these copies Walcutt & Leeds used two phonographs connected mechanically. Upon one of these was placed the sound record and a copy of it was made mechanically on a blank cylinder placed on the other. The only question raised in the testimony or the briefs in the case, was as to whether the use



of phonographs to make a copy of sound record was outside of the normal use of the phonograph, so that such use was not covered by the license implied from the sale of the instrument. The American Graphophone Company claimed that as their patent covered the product of the machines, Walcutt & Leeds had no right to produce that product by the use of a licensed machine with a mechanical addition to it. Judge Wheeler sustained this claim and enjoined Walcutt and Leeds from making these <sup>waxes</sup> ~~records~~ in the above-mentioned manner, and in the other suit Judge Iacombe, as a matter of course, made a similar decree against the corporation. In neither of the suits was any point made either on the record or in the briefs than the point above explained. The argument was confined to that one question and the issue was not raised as to whether these copies were sound records as distinguished from copies of sound records. It was also taken for granted that patents Nos. 314,214 and 314,288 covered cylinders capable of producing sound whether made in the manner described in the patent or otherwise. For the purpose of the argument it was also assumed that a soap blank having on it indentations capable of producing wax-like sounds was an equivalent to the sound record in a wax or wax-like substance as described in that patent. Also the validity of the two said patents was not disputed by us. They are very generally disputed and have never had their validity established in any suit where a full bona fide defense was made. The only suit where a full bona fide defense was made respecting the validity of said patents was



the one in the New Jersey Circuit against the Edison Phonograph Works, and the Graphophone Company compromised and settled that case. My clients, Walcutt & Leeds, had not the money to go into the case on the merits of the patents, so I made no attack on them.

It is evident that both these points and many others might have been raised in that or a similar case, but we confined the question at issue entirely to the one point above stated. In support of the above statements I would refer to the record and briefs in the above cases, which I understand, are to be used at the hearing of the motion for a preliminary injunction in a suit brought by the said plaintiff against the United States Phonograph Company and George E. Tewksbury. I make this affidavit for use in that case. Mr. Tewksbury was named as a party defendant to the case against the corporation Walcutt & Leeds, Limited. I did not appear for him in the case and no one represented him in it, and I understand he was never served with process, being a resident in New Jersey and not having a place of business in New York. I understand that he had nothing to do with the business of that corporation and that his only interest in it is as a stockholder.

Sworn to and subscribed :  
 before me a Notary Public :  
 of New York State, this :  
 day of May, A.D., :  
 1898 at New York City. :



UNITED STATES CIRCUIT COURT

District of New Jersey

AMERICAN GRAPHOPHONE COMPANY  
Plaintiff

- VS -

UNITED STATES PHONOGRAPH COMPANY  
Defendant

IN EQUITY.

BRIEF FOR DEFENDANT UNITED STATES PHONOGRAPH COMPANY ON MOTION  
FOR PRELIMINARY INJUNCTION.

The above suit is brought by the American Graphophone Company to restrain the United States Phonograph Company from making "duplicate" records. The depositions show that the United States Phonograph Company had purchased phonographs which have been licensed under the plaintiff's patents Nos. 341,214 and 341,288, and blank cylinders, commonly called "blanks" also licensed under those patents; that by means of these licensed phonographs it has made on these licensed "blank" records of musical and other sounds, and from these records so made, called "originals", it has, by means of the licensed phonographs with additional mechanism, made copies on licensed blanks. These copies are called in the trade "duplicates". The question in the case is as to whether the making and vending of these "duplicates" is an infringement of the complainant's patents.

In this motion for a preliminary injunction, the question is limited as to whether such manufacturing of duplicate records on licensed blanks is an infringement of claims Nos. 7, 8, 10, 17 and 18 of patent No. 341,214. Those claims are as follows:



7. A sound-record consisting of a tablet or other solid body having its surface cut or engraved with narrow lines of irregular or varied form corresponding to sound-waves, substantially as described.

8. A sound-record consisting of a tablet or solid body having its surface cut or engraved with a number of lines of variable cross-section, the irregularities or variations corresponding in form to sound-waves, substantially as described.

10. The sound or speech record cut or engraved in wax or a wax-like composition, substantially as described.

17. The sound-record in the form of an irregular groove with sloping walls cut in solid material, substantially as described.

18. The sound-record cut in wax or wax-like composition in the form of an irregular groove with sloping walls substantially as described.

In the moving papers, the plaintiff's claim is limited to infringement of those claims. The alleged infringement therefore is limited to the manufacture and sale by the defendant of tablets having sound-records cut or engraved on them. As the tablets admittedly are licensed under the complainant's patent, the preliminary injunction asked for is to restrain the defendant from cutting sound-records on licensed blanks by means other than a phonograph having a cutting style vibrated by the direct ~~wax~~ impact of sound-waves on a diaphragm.

The defences interposed by the defendant are:

1. That the claims in question of the plaintiff's patents are invalid.

2. That the defendant has not infringed the claims.

3. That the issue raised in this suit has already been decided in the defendant's favor in a former suit in this Court between the same parties.



## FACTS.

A short statement of the history of the Phonograph and the development of the business may assist the court in its consideration of the case.

The phonograph was, as is well known, invented by Mr. Edison. His earlier machines patented in 1878 pursued the method of indenting and of engraving, but the best results were obtained from the indenting process. Like all inventions, it was slow in being developed to a practicable condition, but no more so than was the telegraph or the telephone. Mr. Edison and others worked on the invention, and, beginning about 1887, numerous patents for improvements were taken out and machines capable of more or less practical use were made. Bell and Tainter claimed to have invented the cutting process of making a record, and also the use of a wax-like composition for a tablet on which to put it.

In 1888, efforts were made to exploit the business. Jesse H. Lippincott became the sole licensee for the United States of the instruments to be made under the Bell and Bell and Tainter patents. After he had acquired these rights he purchased the control of the phonograph patents and transferred them to the North American Phonograph Company, a corporation organized by him for that purpose. The American Graphophone Company, which owned the graphophone patents for the United States, was a party to this combination, and on August 6th, 1888, licensed Lippincott to handle phonographs and supplies on the payment of a royalty. The language of that license is as follows:

"Whereas, the said Lippincott desires to secure a modification of his agreement with said American Company so as to enable him to handle the phonograph as well as the graphophones; and

Whereas, said American Company has agreed to said



Now, therefore, it is agreed by and between said American Company and said Lippincott as follows:

SIXTH: On each and every Phonograph sold or leased by said Lippincott or the said North American Phonograph Company or by any sub-company or agent of the said Lippincott or the said Company, the said Lippincott shall pay to the said American Company the sum of ten dollars(\$10), and on all cylinders and supplies for the said phonograph one fourth of the difference between the cost of said cylinders and supplies to the said Lippincott or the said North American Phonograph Company, and the price at which the same may be sold to the public<sup>n</sup>

- 4 -



Phonograph Company became insolvent, and in August 1894 went in to the hands of a receiver. All its rights in the phonograph patents were sold by the Receiver, and bought by the National Phonograph Company, which now owns and controls all the phonograph patents.

Among the sub-companies above referred to was the New Jersey Phonograph Company, organized under the laws of this State, and having from the North American Phonograph Company a territorial license for this State. It began business in 1889 and went out of business in January 1894. At that time the defendant, the United States Phonograph Company, purchased all the machines and supplies belonging to the New Jersey Phonograph Company, including a number of phonographs that had been sold to it by the North American Phonograph Company, under the license granted by the American Graphophone Company to Bippincott. It is those phonographs that the defendant uses in making "original" and "duplicate" records. The facts will not be denied and sufficiently appear from the affidavits on behalf of the defendant and the record of the former case brought in this Court by the complainant and the defendant.

The blanks used by the defendant are purchased from the National Phonograph Company, which, as I have explained above, holds all the phonograph patents, including the patent for the Edison blank. Soon after Bippincott's death, the American Graphophone Company claimed that the license of the North American Phonograph Company to handle phonographs and supplies, no longer existed, and it began suit against some of the sub-companies who used and sold those phonographs, and also against the Edison Phonograph Works which manufactured them. In these suits they claimed that the engraving process was an infringement on their patents. The United States Phonograph Company being a very large user of blanks and seller of records was also sued, and the defence of the suit against it was undertaken by Mr. Edison and his counsel, Messrs. Dyer &



Oriscoll, and the suit was combined with the suit against the Edison Phonograph Works, the evidence in each case being stipulated into each other. Both were both argued together on final hearing before Judge Green, but were not decided by him at the time of his death. When the suit against the United States Phonograph Company was first brought, an application was made for a preliminary injunction, which was refused by Judge Green. At the time these suits were pending, the Graphophone Company had appropriated Mr. Edison's soap blank and his sapphire recorder and reproducer, and by means of them made the graphophone available commercially. Suits therefore were brought ~~by~~ under those Edison patents against the Graphophone Company. These suits were pending at the same time that the case against the Works and the United States Phonograph Company were argued.

After Judge Green's death, a settlement was arrived at between the phonograph and graphophone interests, which resulted in each side consenting to final decrees being made against the respective defendants in the various suits pending between them; and at the same time reciprocal licenses were given, licensing the American Graphophone Company and National Phonograph Company (then owning the phonograph patents) respectively, to make and sell talking machines and supplies under the patents of the respective interests. It was also provided in the license that any articles that had been put out commercially by either interest prior to the settlement could continue to be made and sold whether coming under the patents mentioned in the agreement or under other patents of either party. The language of that clause of the agreement is as follows:



In the suit against the United States Phonograph Company a different course was pursued, and a decree was entered by consent, discontinuing the suit. The United States Company was not made a formal party to the agreement. At the time of the pendency of that suit, the United States Company was making records both "originals" and "duplicates" on the licensed phonographs on blanks purchased from the Edison Companies, and since the discontinuance of that suit and the agreement between the two parties, the United States Phonograph Company has pursued the same business, making "original" and "duplicate" records by means of licensed phonographs, on blanks purchased from the National Phonograph Company, which, under the agreement, are licensed under the patents in suit.

#### ARGUMENT.

The legal questions involved are as follows:

##### I.

Are the graphophone patents valid?

The claim involved in their patents is for the cutting or engraving process. In answer to that we claim that the early patents of Mr. Edison and especially the English patents, show that method of recording, and that Mr. Edison had pursued that method long before it had been thought of by Bell and Tainter, and also that the work of Lambrigt <sup>and Gros</sup> was of the same character, and therefore the cutting or engraving process is not patentable.

##### II.

We claim that the defendant had not infringed the patent in suit. It is not claimed that the defendant infringes by making original records on its phonographs, but it is claimed that the use of these phonographs with additional appliances to copy on licensed blanks the records already made on



these phonographs, is an infringement of the claims in suit. These claims, generally speaking, are confined to a sound record made by the engraving process. Our defence that there is no infringement, divides itself into four branches.

(a) The claims are for a "sound" record; that is to say, a record of sound. We claim that the "duplicates" we make are not records of sound, but are merely copies of records made by sound, and cannot properly be called "sound-records". It is very evident from the patent that the use of the word "sound-record" was intended to apply only to records made by the direct use of sound.

(b) The claims in the patent are intended only to cover "sound-records" made in the manner described in the patent. Each of the claims contains the qualification "substantially as described." From the language of the patent it is evident that there was nothing in the mind of the inventor excepting sound-records made in the manner indicated by the patent, that is by the impact of sound waves on a diaphragm, which vibrates a cutting style and so makes indentations in the tablet.

(c) The claim of the patents in suit must be confined to a sound record in wax or waxlike composition, as the invention is confined entirely to that method of making sound record. The records made by the defendant are not cut in wax or a waxlike composition, but are cut in a metallic soap, which is entirely different in characteristics from the tablet described by the complainants. These soap blanks are not equivalents, as the waxlike tablets differ materially in character from the soap blanks, and records were never successfully made on them. The first success obtained in making records was the result of Mr. Edison's scientific investigation, which enabled him to learn that in order to reproduce certain sounds successfully a hard substance was necessary for the tablet in contradistinction to a soft waxlike tablet. We therefore claim that a



record cut in soap blanks is not within the claim of the patent

(d) The blanks purchased by the defendant from the National Phonograph Company are licensed generally under the two patents of the complainants 341,214 and 341,288. Where an article is licensed under a patent and nothing is said as to any restrictions, a purchaser of that article certainly has a right to use it in any way indicated by the patents; and to insist that it is licensed under every one of the claims of the patent that are applicable to it. Claim 13 of patent 341,214 is for a "tablet or body for recording sound vibrations." Although in that claim the tablet is described as made of paste-board covered with wax, if, as the complainants claim, the Edison blank is an equivalent for the blank described in the graphophone patent, it cannot successfully be disputed that the blanks purchased from the National Phonograph Company are licensed under that claim. Also in patent No. 341,288 under which these blanks are also licensed, there is a claim No. 4 for a "tubular self-sustaining tablet for recording sound or sonorous vibrations." That claim certainly describes the Edison blank, and those blanks are licensed under it. This being the case, we maintain that the plaintiff having licensed a blank intended for having sound or sonorous vibrations cut upon it, and having in no way restricted the means by which such sounds or sonorous vibrations shall be cut on the tablet, ~~xxxxx~~ the defendant, having purchased such tablet from the licensee, has a right to cut such sound or sonorous vibrations on that tablet in any manner it sees fit.

### III.

The issue involved in this case having already been litigated in this court between the same parties, and a decree having been entered discontinuing the suit, it is in effect an adjudication in favor of the defendant and the plaintiff cannot again litigate those same questions. Also, even if this



court should hold that the decree of discontinuance does not operate as a technical estoppel against the plaintiff, still there is evidence clearly showing that the discontinuance was in the nature of a settlement between the parties, and was part of the general arrangement between the Graphophone Company and Mr. Edison's companies, and that the intention of all the parties was to authorize the United States Phonograph Company to continue to carry on the same business it had been carrying on ~~in~~ up to the time of the settlement. Under these circumstances, it would be inequitable to allow the plaintiff to prosecute this suit.



UNITED STATES CIRCUIT COURT.  
DISTRICT OF NEW JERSEY.

-----	x	
	:	
AMERICAN GRAPHOPHONE CO.,	:	
	:	
vs.	:	IN EQUITY.
	:	
UNITED STATES PHONOGRAPH CO. et al.	:	
	:	
-----	x	

SUPPLEMENTAL BRIEF FOR COMPLAINANT.

Defendants have, at the last moment, served on us a large number of voluminous affidavits resulting from the industry of many counsel.

The important question which arises in dealing with the mass of these affidavits is, what matters are open for consideration by the Court on this proceeding?

If the tactics to which defendants have resorted are allowed to prevail it would manifestly be impossible ever to secure a preliminary injunction; for the industry of counsel can always multiply words to such an extent as to impose enormous labor on the Court, and to raise more questions than the Court, within ordinary limits of human endurance, could possibly investigate and pass upon.

The case presented by complainant is simple and definite. The indisputable facts are such that, under the settled rule of law, the question of validity of the patents is not open at this hearing except for the consideration of a new defense; and if such new defense is presented it must, to



avail the defendants, be such as, if presented in the previous adjudicated cases, would beyond reasonable doubt have led the Court to a different conclusion.

If the Court adopts and follows the rule of the decided cases on this point, a very simple case will be presented for decision. If not, the door will be opened to almost interminable discussion, which however, will eventually lead to the conclusion that the presumptions in favor of the validity of the patent are such that complaintant's rights will be assumed until final hearing.

The question then is, have defendants set up a new defense which clearly satisfies this Court that the previous decisions holding the patents to be invalid were erroneous.

The only difficulty that attends the consideration of this question is that of searching through the mass of papers to detect the presence of such new defense; and it may not be amiss here to point out that, if defendants had any defense on which reliance could be placed, they would not have buried it in such a collection of miscellaneous rubbish. We may further remark, after diligently plodding through all these papers, that the only possible ground of a denial of the motion would be that the labor of investigating the nature, pertinence, and bearing of all these matters, is too great to be assumed in advance of final hearing. This, however, instead of being ground for denying the motion, is the best possible reason for granting it; and if we are not



greatly mistaken in our view of the manner in which these tactics will address themselves to the mind of the Court, defendant's counsel have pursued the surest road to defeating their object.

## I.

THE PRESUMPTION OF VALIDITY OF THE PATENT IS SUCH THAT NOTHING ADVERSE THERETO PRESENTED BY DEFENDANTS IS ENTITLED TO CONSIDERATION IN ADVANCE OF THE FINAL HEARING.

This presumption is established (1) by the prior adjudications, one of them against a concern with which defendants were closely related, and in whose goods they have been dealing; (2) by the acquiescence of the only person whose work in this art entitled him to dispute the originality of the invention of Bell & Tainter, and whose work furnished the only basis on which their originality was ever disputed. We refer, of course, to Mr. Edison.

Referring now to the expert affidavit of Mr. Vansige, we find that it is almost wholly occupied with a statement of what appears in Edison's prior U. S. and foreign patents. Inasmuch as these were before Judge Grosscup in the Amet case and the Boswell case, and before Judge Wheeler in the Walcutt & Leeds case, this Court will certainly not now reconsider them; but will hold, as Judge Grosscup held in the recent Jones case, that "this case is, therefore, not open upon the question of validity of these claims" (Moving Papers, p.42).

MR. Van Size also refers in an incidental way to a French patent of one Cros, to a French publication "Le Rappel"



and to alleged experiments of Lambrigot and Carbonel. These citations call for no comment because -

1. They have been in all the answers from the beginning, and are neither new nor of the slightest importance;
2. They are not before the Court.
3. Mr. Van Size does not base his opinion on them, but on the threadbare Edison defense.

The affidavit, therefore, presents nothing to which the Court will devote a moment's consideration.

In this same connection we would briefly notice the astounding and reckless false statements of Walcutt and his counsel, West, (the former of whom, Tewksbury's partner is now under penalty for contempt of the Court's order in New York), to the effect that the defense of license was the only one presented to Judge Wheeler. These statements are reckless and astounding because the record and brief for defendant in those cases show that the Edison defense, embracing the very patents from which Van Size quotes, were before the Court, as well as the propositions that the first graphophones were not successfully used, and that the sound-records now used are not made in "wax-like" materials.

## II.

ANALYSIS OF DEFENDANTS' PAPERS SHOWS NO DEFENSE TO THIS MOTION.

### Laches.

There seems to be, in some of the numerous affidavits, a suggestion that complainant should be denied relief



on the ground of laches. Inasmuch as complainant ruled for this relief as soon as an adjudication was had which presented identically the same infringement, and in a case where the last of the defenses that might be anticipated was disposed of, it is not seen that this suggestion of laches calls for more than a passing notice.

In fact there was no delay in bringing this suit after knowledge (as distinguished from mere suspicion) that defendants were manufacturing duplicate sound-records, was obtained by complainant. But if there were in fact undue delay in bringing suit, it would be of no consequence.

Complainant has been diligent in pursuing infringers during the whole period of the alleged delay.

The authorities are uniform in holding that these facts justify much greater delay than that charged against complainant.

Van Hook v. Pendleton, 24 Fed. Cases, 991.  
 Norton v. Can Co., 57 F. R. 993.  
 Edison E. L. Co. v. Sawyer Man. Co., 53 F. R. 597.  
 Id v. Mt. Morris Co., 57 F. R. 644.  
 Carter v. Wollschlaeger, 53 F. R. 573.  
 Collignon v. Hayes, 8 F. R. 912.  
 Rumford Chemical Works v. Vice, 2 B. & A. 535.  
 Telephone Co. v. Telephone Co., 34 F. R. 802.  
 Green v. French, 16 O.G. 215.

In the last mentioned case (which states the same rule as applied in all the others) Judge Nixon, quoting with approval from Van Hook v. Pendleton, said:

"The owner of a patent was not to be charged with acquiescence in an infringement because he withheld suits during the pendency of other suits to determine his rights under the patent".



THE EFFECT OF THE PRIOR SUIT AGAINST THESE DEFEND-  
ANTS.

The next matter that calls for notice is the effect of the prior discontinued case against these defendants. This point is readily disposed of. That case was either an adjudication of the present cause of action, or it was not. If not, it is without any effect. We need, therefore, go no further than to point out that it was not an adjudication of anything, much less of the present cause of action. The authorities referred to on pages 12 and 13 of our printed brief dispose of the matter.

But in fact, not only is the present cause of action based on infringing operations covering a period of over a year after that suit was dis-continued, but the present suit is for a totally different kind of infringement. (Moving papers, pp. 37 and 39) This is confirmed by the quotations made in Mr. Hays's affidavit from the record in the former case, showing that the infringement there complained of was the use of Edison Phonographs and blanks made by the Edison Phonograph Works. As we have shown (p. 40), this former suit was part of a litigation against the Edison Phonograph Works and in the suit against the latter, a decree sustaining the patents was entered. If, therefore, this prior suit has any bearing it makes in favor of the complainant.

The statements by Mr. Tewksbury and Mr. Hayes to the effect that there was an "understanding" that defendants were to be at liberty to infringe these patents by manufac-



turing duplicate sound records that "understanding" on their part could hardly amount to a license from complainant (who certainly had no such understanding) and give the defendants the rights they now claim.

The affidavit of Mr. Tewksbury contains certain statements so erroneous that we have deemed it proper to reply by affidavits of Mr. Edmonds and Mr. Mauro.

#### THE PRIOR ADJUDICATIONS.

Mr. Driscoll, in a long affidavit, not characterized by entire fairness, assumes to review the prior litigation, the impression gathered from the whole affidavit being, that, in Mr. Driscoll's opinion, the counsel employed in these cases did not defend as ably or as effectually as they might have done. The ability of counsel in these cases, and the extent to which they exerted themselves on behalf of their clients, are not matters for present inquiry, though we are bound to say that Mr. Driscoll is not justified in his criticisms and conclusions. In reviewing the Amet case, Mr. Driscoll omits the material matters; namely, that the answer was identically the same answer as that of the present defendants, including everything now set up (except, of course, the effect of the prior suit); and that the Edison defense was introduced and pressed. Mr. Driscoll goes so far as to say that the novelty of the sound record was assumed "without a contest as to the fact". Judge Grosscup,



however, in the latter case against Jones (p. 41, Moving Papers) said that the combination claims sued on in the Amet case were sustained "upon grounds, that logically involved the validity of the sound-record as an article of manufacture".

In the Boswell case the Edison defense was again presented and Judge Grosscup said he had fully passed on it and declined to hear further argument thereon (p. 39).

Mr. Driscoll criticises Mr. Mauro's statement that the charge of infringement in the former case against these defendants was "virtually confined to claims 1 and 4 of Patent No. 341,288", and says that Mr. Mauro was mistaken in this statement. Mr. Mauro, however, was not mistaken. The charge of infringement was based entirely upon the use of blanks such as covered by claims 1 and 4 of Patent 341,288. There was no other charge in the case. Complainants contended that claims 7, 8, etc., of patent No. 341,214 were infringed because the sound-records were made on unlicensed blanks, as Mr. Driscoll can readily ascertain by reading the record in that case, or the affidavit of Mr. Hayes in this. The affidavit of English certainly presents no matter of defense, and therefore need not be commented on. It is an affidavit offered in a suit against Leeds & Baldwin, and to which admission was refused by Judge Lacombe.

Respectfully submitted,

Anthony Pollok,  
Philip Mauro,  
Richard M. Dyer,  
S. O. Edmonds,  
Counsel for Complainant.

May 27, 1898.



UNITED STATES CIRCUIT COURT  
DISTRICT OF NEW JERSEY

American Graphophone  
Company

Pltff.

vs

United States Phono-  
graph Company et al  
Defts.

In Equity.

Affidavit of  
William B. Vansize.

Hayes & Lambert,

Solrs.

Law Offices,  
Hayes & Lambert,  
Newark, N.J.

ROOM 508, PRUDENTIAL BLD'G.  
765 BROAD STREET.



CIRCUIT COURT OF THE UNITED STATES.

District of New Jersey.

American Graphophone Company I  
vs. I  
United States Phonograph Com- I In Equity.  
pany and George E. Tewksbury. I

AFFIDAVIT OF WILLIAM B. VANSIZE.

District of New Jersey    I  
City of Newark,                I    ss:  
County of Essex.               I

WILLIAM B. VANSIZE being duly sworn, deposes and says:-

I have made another affidavit in this case in which I have considered the absence of novelty and patentability of the subject matter included in claims 7, 8, 10, 17 and 18 of patent No. 341,214, dated May 4, 1886, to Bell and Tainter, being one of the patents involved in the above-named suit.

Upon examining British Letters-Patent No. 6027 of 1886, dated May 4, 1886, to James Yate Johnson, a communication by the Volta Graphophone Company, I find that the specification and the drawings are substantially identical with the specification and drawings of United States Patent to Bell and Tainter above-referred to, and that the claims numbered 7, 8, 10, 17 and 18 were at the date of issue identical in the two patents. Subsequently and on or about October 7, 1890, claims numbered 8, 10, 17 and 18 were disclaimed and stricken out of the British Patent by proceedings taken by the owners of the said British Patent. The application for amendment of the specification as described stated the reasons for making the amendment, which I quote:-



Our reasons for making this amendment are as follows:  
"That we have been advised that many of the claims are unnecessary to protect the invention.  
"That it is doubtful whether some of the claims are not wanting in patentable subject matter.  
"That the subject matter of some of the claims is of doubtful novelty.  
"That there are clerical errors in the said specification which we are desirous of correcting."

The application for amendment was filed by "The International Graphophone Company of New York" who were the registered assignees. The Volta Graphophone Company was a corporation having its principal place of business at Alexandria, Virginia, as appears from the recital in the specification of the British Patent.

The proceedings in the British Patent Office were a formal disclaimer and abandonment of the subject-matter of claims 8, 10, 17 and 18, for want of patentable novelty.

*M. B. Vane*

Subscribed and sworn to before me

this 25<sup>th</sup> day of May 1898.

at Newark N.J.

F. B. Stewart  
Notary Public  
New Jersey



U. S. Circuit Court.  
District of New Jersey.

American Graphophone )  
Company, ( vs. ) In  
United States Phono- ( Equity  
graph Company. )

Patents 341,214 & 341,288.

Stipulation.

Hayes & Lambert,  
Solsrs.



UNITED STATES CIRCUIT COURT,  
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,

vs.

UNITED STATES PHONOGRAPH COMPANY.

I N E Q U I T Y.

Patents 341,214, 341,238.

It is stipulated between the counsel for the American Graphophone Company and the United States Phonograph Company, a defendant in the above cause;

1. That so much of the duplicating machines in use by the defendant shown in complainant's exhibit, "sketch of defendant's duplicating machine", as consists of part or parts of a phonograph, was purchased by the United States Phonograph Company from the New Jersey Phonograph Company and by the New Jersey Phonograph Company from the North American Phonograph Company, and that Jesse H. Lippincott while President of the North American Phonograph Company paid to the American Phonograph Company a royalty of Ten dollars on each said phonograph in accordance with the provisions of a contract between the North American Phonograph Company, Jesse H. Lippincott and the American Graphophone Company, dated August Sixth, eighteen hundred and eighty-eight;

2. That the blanks used by the defendant to make duplicates of sound records similar to complainant's exhibit "defendant's duplicate of sound record", are made on blanks purchased from the National Phonograph Company and sold by them subsequent to the execution of the agreement dated December Seventh, Eighteen Hundred and ninety-six between the American Graphophone Company and the National Phonograph Company and the Edison

Phonograph Works:



3. That the original sound records from which the said duplicates were made, being similar to complainant's exhibit, "defendants' original sound record", were made by means of phonographs licensed under the complainant's patents in suit, upon blanks purchased after December Seventh, eighteen hundred and ninety-six, from the National Phonograph Company.

4. That the following depositions or parts of depositions given in the suit brought in this Court by the Complainant herein against Edison Phonograph Works may be used as taken in this suit, viz:

A. So much of the direct deposition of George Towksbury as was given in answer to Qs 1 - 3, inclusive, and 30-46 inclusive, with the answers to xQs 50-63, inclusive, in the evidence taken upon the Plea in that suit;

B. The entire depositions, both direct and cross, of Andrew Devine and E. D. Easton taken for final hearing; and

C. The direct deposition of C. S. Tainter given in answer to Qs 1 - 15, inclusive, and his entire deposition in rebuttal, both taken for the final hearing; the Defendant's Counsel to have the option either to incorporate the cross-examination of said Tainter into the present case, or to have Tainter produced for cross-examination.

5. That the evidence taken by either party in the suit in this Court between the same parties on patent 341,287 may be used in this suit, provided notice of intention so to do, describing the depositions, is given before the two cases are finally closed.



IN THE CIRCUIT COURT OF THE UNITED STATES  
FOR THE DISTRICT OF NEW JERSEY.

-----  
AMERICAN GRAPHOPHONE COMPANY :  
 :  
-vs- : IN EQUITY.  
 : (On Patents Nos.  
UNITED STATES PHONOGRAPH COMPANY AND : 341,214 & 341,288)  
GEORGE E. TEWKSBURY. :  
-----

TESTIMONY ON BEHALF OF COMPLAINANT, taken de bene esse  
in accordance with the provisions of the Revised Statutes,  
and by consent of Counsel for Defendant, before Reeve Lewis,  
a Notary Public in and for the District of Columbia, at the  
offices of Messrs. Pollok & Mauro, #620 F. Street, Washington,  
D.C., beginning at 10 o'clock in the forenoon of June 23rd,  
1898.

Present:

Philip Mauro, Esq., of counsel for Complainant.

Complainant's counsel states that he is in receipt  
of a letter from Mr. Howard W. Hayes, Counsel for  
Defendant, directing that Complainant's counsel  
proceed with the direct examination of the witnes-  
ses, reserving the right of exception.

Complainant's Counsel offers in evidence a copy of  
the specification and drawings of Letters patent Nos. 341,214  
and 341,288, both dated May 4th., 1886, to be marked respec-  
tively "Complainant's Exhibit patent No. 341,214, In Suit"  
and "Complainant's Exhibit Patent No. 341,288, in Suit".

AND THEREUPON, Shelton T. Cameron, a witness pro-



duced on behalf of Complainant, being first duly sworn, testified as follows:

Q1. Please state your name, age, residence and occupation ?

A - Shelton T.Cameron; age 40 years; residence, Washington, D.C; occupation, Solicitor of Patents and Expert in Patent causes.

Q2. Please state what experience you have had in the examination of patented and unpatented inventions and in comparing the same for the purpose of determining their substantial identity and similarity, and generally as an expert in Patent Causes ?

A.- Having a natural taste for mechanics and mathematics, I spent much time during the earlier years of my life in the work shops and manufactories, studying the construction and operation of machinery therein employed, and I was for more than eight years an Assistant Examiner in the United States Patent Office, where it was a part of my daily duty to study devices for which patents were sought, investigate the state of the art relating thereto as the same might be found in domestic and foreign patents and in other places and to report upon the patentability or non-patentability thereof. In the practice of my profession I have prepared and prosecuted many applications for patents and have been frequently called upon to testify in the Courts as an expert in patent causes.



Q.3. Are you familiar with apparatus for recording and reproducing sounds such as are now and have formerly been employed, and with the construction, organization and mode of operation of such apparatus ?

A. I am.

Q.4. Have you heretofore testified in any suits brought for the infringement of patents relating to the recording and reproducing of sounds ?

A. I have. I have testified among others in the case of the American Graphophone Company against Walcutt and Leeds, and the United States Phonograph Company -vs- The Chicago Talking Machine Company, and I have recently given an expert affidavit in the case of the American Graphophone Company versus Walcutt & Leeds, Limited.

Q.5. Have you read United States patent No.341,214 granted to C.A.Bell and Sumner Tainter and No.341,288 granted to Sumner Tainter, both dated May 4th.,1886, and do you understand the construction and operation of the devices therein shown, described and claimed ?

A. I have read the patents referred to and think I understand the construction and operation of the devices therein described.

Q.6. Please state what inventions or improvements are defined in claims 7- 8- 10- 17 and 18 of the Bell & Tainter patents No.341,214 in suit ?



A" The patent referred to relates to the art of recording and reproducing sounds and more especially to the apparatus and method employed in recording and reproducing sounds, as well as the material constituting the body<sup>upon</sup> or in which the record of the sounds is formed.

The principles of construction set forth in this patent are embodied in the talking machine now well known as the "Graphophone" and the improvements defined in the claims mentioned in your question can best be explained by a brief review of the prior art of recording and reproducing sound.

This art may be said to have had its beginning about 1857 when Leon Scott devised an instrument called the "Phonautograph" by means of which he was able to produce a graphic representation of the atmospheric vibrations characteristic of sound waves. The phonautograph was provided with a cylinder mounted to simultaneously revolve and progress longitudinally, the periphery of the cylinder being covered with lamp-black paper. Adjacent to the cylinder was mounted a vibratory diaphragm having a cone or a funnel on one side thereof and a style, such as hog-bristle, attached to the other side, the free end of the style being in contact with the lamp-black surface of the rotating and longitudinally advancing cylinder. In the absence of sound the style would scrape off the lamp-black and expose the paper in an even spiral line around the cylinder, but when the diaphragm is caused to vibrate by sound compressed thereon through the funnel or cone the vibrations are transmitted



through the style and cause it to trace a sinuous or undulatory spiral line on the lamp-black paper, the sinuosities exactly corresponding to the atmospheric vibrations characteristic of the sounds impressed upon the diaphragm. The sinuous or undulatory line is rendered visible by reason of the fact that the style displaces the lamp-black and exposes the paper beneath. The action of sound waves is very weak, but the film or lamp-black is so thin and light that it interposes no perceptible resistance which might tend to modify the vibrations of the style. The result is that the line traced by the style in the lamp black is a graphic record of the atmospheric vibrations characteristic of sound waves.

A very simple form of the phonautograph consists of a tuning fork having a fine point or style attached to one of its prongs and a plate of smoked glass. When the tuning fork is excited it vibrates and if it is drawn along with its points or style resting gently upon the surface of the smoked glass it will trace a sinuous or undulatory line corresponding to the atmospheric vibrations characteristic of the sounds given out by the tuning fork. The phonautograph makes a visual record of the sounds but it is incapable of reproducing them, and hence was useful solely by reason of the fact that it served to demonstrate the wave theory of sound. Scott produced a graphic record of sound but devised no means for reproducing the sounds<sup>so</sup> recorded.

The invention of the speaking telephone in 1876 by Al-



exander Graham Bell demonstrated that sounds of every sort could be reproduced by causing the diaphragm to vibrate in correspondence with atmospheric vibrations characteristic of such sounds, that is, by causing the reproducing diaphragm to copy the motions which the diaphragm would make when thrown into vibration by any sound producing agents. In the telephone the diaphragm of the receiver was caused to follow the motion of the transmitting diaphragm by electrical energy, but to record and reproduce sound it was necessary that some mechanical means should be devised to cause the reproducing diaphragm to copy the motions of the recording diaphragm. Manifestly, if the lamp-black of the Scott phonautograph with the approximately correct graphic record could be petrified or hardened, and a style attached to a diaphragm caused to travel rapidly in the undulatory groove or line constituting the record, it would cause the diaphragm to copy within a fair degree the motions of the recording diaphragm, and thus reproduce though possibly in an imperfect manner the recorded sounds. Many efforts were made to produce a "sound record" or "phonogram" which should produce sufficient stability to compel the reproducing diaphragm to correctly copy the vibrations of the recording diaphragm. Attempts were made to trace the line in a soft film and afterwards harden the film, and it was also sought to trace the line as in the phonautograph and obtain the desired solid tracing by processes similar to photogravure. This line whether obtained as the result of the direct action of the



recording style or as the result of copying the original tracing by etching photograving, stereotyping, or otherwise, was technically designated a "phonogram" or "sound-record".

The credit of first devising means which would cause the reproducing diaphragm to copy the motion of the recording diaphragm belongs to Mr. Thomas A. Edison, who in 1877 brought out an instrument called the "phonograph", which mechanically reproduced sound, though in an imperfect and unsatisfactory manner. This instrument is shown and described in Mr. Edison's patent No. 200,521, and it consists generally speaking of certain improvements on Scott's phonograph whereby it is rendered capable of both recording and reproducing sounds. Mr. Edison's phonograph, like the Scott phonograph, has a rotating longitudinally advancing cylinder and a vibratory diaphragm adjacent to the cylinder which is provided with a cone or mouth piece for conducting the sounds against the diaphragm on one side and a style on the opposite side. Around the cylinder Edison formed a spiral groove and instead of lamp-black paper he covered the cylinder with tin-foil or other material which would yield sufficiently to allow it to be indented or embossed, the point of the style contracting with the foil in the line of the spiral groove formed in the cylinder. By reason of the rotary longitudinal advancing movement of the cylinder the style is caused to track in the spiral groove all the time. When the style was vibrated by sound waves impinging upon the diaphragm, the point of the style indented or embossed the tin-foil, the spiral groove in the cylinder per-



mitting such embossing or indenting action, and since the style moves in consonance with the sound vibrated diaphragm, the indentations in the tin-foil corresponded with more or less accuracy to the vibrations of the atmosphere characteristic of the sounds, and hence these indentations constituted a more or less accurate record of such sounds. Instead, therefore, of the record appearing as a laterally sinuous line contrasting in color with the general surface of the cylinder by reason of the displacement of an external film ~~z~~ so as to expose the backing beneath, as in Leon Scott's Phonautograph, the record appears in Edison's phonograph as an embossed or indented line of variable depth, the variations theoretically corresponding with the variations in the amplitude of the vibrations of the sound waves. In order to reproduce the sounds thus recorded a second diaphragm lighter and more sensitive than the recording diaphragm was stretched in front of the trumpet and carried a reproducing style held in contact with the bottom of the undulatory groove in the tin foil, consequently when the cylinder was returned to its original position and again rotated and advanced the style should follow the undulations in the groove and thereby impart vibrations to the reproducing diaphragm, which vibrations would be a more or less accurate copy of the original motions of the recording diaphragm. These movements of the reproducing diaphragm set the adjacent air into vibration, which vibration constitute audible reproduction of the original sound waves. The scientific and commercial



world was quick to recognize the great importance in practical affairs of an instrument that might effectually record and reproduce sound, and Edison's phonograph was therefore met with widespread interest. The preservation and reproduction of musical compositions by the phonograph; its use instead of a stenographer in taking dictation; the sending and receiving of phonographic letters by mail, the preservation of the voices of loved ones to speak to us after they are dead; these are a few of the many uses to which it was confidently anticipated the phonograph might be put. It never fulfilled these anticipations. While it is true it did record and reproduce sounds, the reproduction was so imperfect that it was difficult to recognize reproduced words unless it was known in advance what they were. The inherent defects of the phonograph were so great and so numerous that it never found a place in practical affairs and was only of interest as a scientific toy.

As a practical instrument it was an entire failure.

Among the many defects which were recognized by these interested in the art of recording and reproducing sound as being responsible for the failure of the phonograph, I will note the following:

First: the embossing or indentation does not constitute a correct record of the sounds impressed on the recording diaphragm. The reason for this is that the force of the diaphragm vibrating under the impact of the sound waves is necessarily very weak, and in the act of overcoming the resistance of the tin-foil the vibrations of the diaphragm



are not only still further weakened, but they are also modified and thus while the record may contain as many undulations as the sound which produced it and in the same order or succession, the character of the undulations constituting the embossed record differs from that of the sounds uttered against the diaphragm. Thus while there may be a true record of the pitch which is dependent upon the number of vibrations in a given unit of time, that characteristic known as the "quality" of the sound is distorted. While the resistance of the metal foil to the embossing or indenting action of the style weakens the vibrations of the diaphragm that resistance is not uniform, since the resistance of the material to the embossing or indenting action increases faster than the depth of the indentations, and hence the modifications due to such resistance would be greater in proportion with vibrations of great amplitude than with vibrations of less amplitude. And since the amplitude of vibration is much greater with ~~XXXXX~~ loud than with soft sounds, it follows that loud sounds were less accurately recorded than faint ones. To such an extent is this true that the individual voice of a loud speaker recorded and reproduced by the phonograph could not be recognized.

Second: The embossing is so delicate and fragile that it is distorted by the action of the style with which it is moved in contact for the purpose of reproducing the sounds, thus still further increasing the imperfection of the reproduction.



It might be more accurate to say that the larger undulations are distorted and the finer ones entirely ironed out or erased. This ironing out and distortion of the record in the act of reproducing is primarily due to two causes, the yielding character of the material in which the record is formed and the ~~xx~~ unyielding action of the reproducer. The latter was capable of adjustment so as to bring the reproducing style into alignment with the embossed groove of the record and it could also be adjusted to determine the radial distance of the style from the center of the cylinder so that the point will just touch the indentations of the embossed record. If the pitch of the spiral groove varies to the minutest decree, the style will be thrown out of alignment; and as it is impossible to get a surface ~~xxxx~~ which is absolutely cylindrical and without the slightest inequality, it followed that the style in the attempt to reproduce the sound not only distorted and altered the indentations by reason of its failure to track in the groove with absolute accuracy, but it also frequently entirely ironed out or erased the finer indentations by reason of the irregularity in the cylinder. This distortion or ironing out of the undulations of the embossed record not only affects such undulations themselves, but it also results in a modification of the undulations immediately in front and to the rear of the undulations thus distorted or ironed out. The tin-foil changes its form not only at the point of immediate contact with the style, but is also displaced and its form changed throughout the surface immediately surrounding the point of contact. This results in a serious mutilation of the re-



cord when undulations thereof are distorted or ironed out, as noted above, and it also absolutely prevents the formation of a true record in the first instance, because each undulation formed by the indenting action of the style distorts and modifies the undulations immediately preceding it and when it is remembered that the amplitude of the vibrations does not exceed one one-thousandth of an inch in the first place, and that these are greatly lessened by the resistance the tin-foil offers to the embossing action of the style, it will be apparent that the modifications of the undulations which take place during the formation of the record amount to radical imperfections.

Third: the tin-foil cannot be removed from the cylinder without still further distorting and mutilating the record.

This results from the fact that the embossing becomes disarranged and the finer undulations thereof obliterated when the thin soft sheet is subjected to the handling and bending necessarily incident to its removal. If the sheet of tin-foil which is wound about a cylinder be loosened and bent or opened outward sufficient to permit it to be removed from the cylinder and free from the spiral groove cut therein, it is evident that the very considerable bending to which it is subjected would effect the indented groove and the slightest change in this groove would result in a very material modification and distortion of the record formed therein.

Mr. Edison's phonograph failed therefore because the recorder did not produce an approximately correct record; be-



cause the material on which the record was formed made it impossible to obtain a permanent record; because the reproducer in the act reproducing obliterated the record; and because the record could not be removed from the machine without mutilation which practically destroyed it.

A period of twenty years intervened between the production of the Scott phonautograph with its graphic record of sound and the Edison phonograph with its crude record and reproduction of sound, and notwithstanding the great interest awakened in the subject by Edison's partial success and the many experimenters that entered the field as the result thereof, it was nearly a decade before success was finally achieved and practical sound recording and reproducing means were devised. It was not until the issue of patent to Bell and Tainter No. 341,214, in suit, that it was amply demonstrated that the problem of recording and reproducing sound with sufficient accuracy and certainty to subserve commercial needs had been solved.

In the apparatus described in this patent instead of tracing the record in a light film of lampblack as in the Scott phonautograph or embossing or ~~intending~~ indenting a record in soft pliable material, as Edison did in his phonograph, Bell and Tainter cut or engraved their record in a solid material of a wax-like character that is a material having properties which enabled it to be engraved smoothly by the feeble force of sound waves and in exact accordance with the vibratory action thereof. The patent in suit to



Bell and Tainter No. 341,214 relates to apparatus for and method of recording and reproducing sound and the material in or upon which the sounds are recorded, and which constitutes the basic element in reproducing. Briefly stated, the method employed by Bell and Tainter consists in causing the sound waves to impinge upon a vibratory diaphragm carrying a cutting style or graving tool with its point imbedded in a solid tablet having a surface composed of material which is amorphous in character, slightly cohesive, such as wax or a wax-like composition. As the tablet has motion relative to the diaphragm, cutting style, and accompanying parts (which taken together constitute ~~xxxx~~ what is technically known as the "recorded"), a groove is cut by the style in the surface of the tablet; and since the cutting style is connected to the diaphragm it necessarily partakes of all the vibrations imparted to the diaphragm by the sound waves which have been caused to impinge thereon. The result is that the groove cut by the style in the surface of the tablet is of varying depth, the bottom of the groove forming a series of waves or undulations constituting an exact record of the sound waves which were caused to impinge upon the diaphragm of the recorder. The action of the recording style is that of a graving tool, the groove being formed by the removal of the material in chips or shavings. The material of which the solid surface of the tablet is composed being amorphous in character and slightly cohesive presents an equal resistance in all directions to the action of the graving tool, and it follows that the walls and bottom of the



groove will be smooth and free from cracks or roughness. This would not be the case if the material of which the tablet is composed were either fibrous or crystalline in character, as the fibrous nature of the material would present unequal resistance to the action of the cutting style and any crystalline formation would cause the material to be removed along the lines of cleavage between the crystals. In practice the record groove has sloping walls which are wider apart at the top than at the bottom. It will thus be seen that the improvements introduced into the art by Messrs. Bell and Tainter as set forth in the patents in suit consist not merely in the improved mechanism but in a radical departure from the method of recording the sound and in the material in which the sound is recorded. The mechanism covered by the patent in suit is not included as a part of the subject-matter of the particular claims concerning which your question inquires, and consequently will be passed with brief reference. It is sufficient to say that it comprises a recorder for recording the sound, a reproducer for reproducing the sound, and means cooperating with the recorder and reproducer so that the record is formed in the recording tablet in a spiral path.

The patent refers to the surface in which the record is formed as a "recording tablet". The essential characteristic of this tablet is that the surface upon which the sound is to be recorded shall be composed of an amorphous and slightly cohesive substance from which the material may be removed in the form of chips or shavings. The patent mentions



as an example of such material a compound of bees wax and paraffin. That portion of the invention which relates particularly to the subject-matter of the claims inquired about can be best understood by referring to certain portions of the specification which I will quote. On page 1, line 15 I find the following statement:

"The invention consists, first, in the formation of the record or 'phonogram', as it has been called, by means of a cutting style which is vibrated by the sound-waves or sonorous vibrations to be recorded. The vibrations may be impressed upon the style directly by the impact of the sound waves upon some device mechanically connected with or carried by the cutting style or its support, or indirectly through the action of an electric current or other suitable vibratory medium. Heretofore a large number of contrivances have been devised for converting electrical impulses into mechanical vibrations, and they could, of course, be used for vibrating the cutting style. Otherwise they have no relations to this part of the present invention, the essential new feature of which is the removal of material to form the record by a cutting, gouging or graving action of the vibrating style. Heretofore the vibrating style has, as in Edison's well known phonograph, simply indented the recording material.

x

x

x

x

Under this part of the invention are included the vibratory cutting style as a new device in a sound-recorder, and the combination of the same with other devices; also the cut or engraved record itself. In this new or improved form of record not only may a larger number of words or sounds be recorded in a given surface than has been practicable in the indented record heretofore in use, but the recorded vibrations are also sharper and better defined. It is found that an indenting style smooths over the crests of the larger indentations and also rubs out some of the finer ones.

The invention consists secondly, in engraving or cutting the record in a waxy or amorphous and slightly cohesive substance, preferably a compound of bees wax and paraffine (the latter in excess) is employed.

This compound has no tendency to clog the style but is readily removed thereby in chips or shavings. The invention consists thirdly, in cutting or engraving the record in the form of a groove with sloping walls, the sound waves being represented by elevations and depressions in the bottom of the groove or otherwise. The advantage of this form of groove is that it forms an efficient guide for the reproducing style."



On page 2, lines 4 - 13, I find the following clause:

"The invention consists fifthly, in reproducing directly from a wax record. It is found that such a record has sufficient strength to withstand the rubbing action of the reproducing style, so that a considerable number of reproductions can be obtained from it. The smoothness of the wax gives it a great advantage in this regard.

So far as we are aware, no one has reproduced sounds from a wax record by rubbing a style or reproducer over it."

On page 6, lines 70 - 79, the patent states:

"The term 'cutting' is herein employed to indicate an action in which the material is removed in chips, shavings or other small pieces - as in engraving, turning and the like and not simply displaced. The displacement of the material is not only a different operation from the cutting contemplated by this invention, but is not contemplated to accomplish the object for which cutting or engraving is employed."

From these extracts it will be understood that the essential characteristics of the material composing the tablet are that it must be amorphous, slightly cohesive, capable of being cut smoothly by a cutting or graving style so as to remove the material from the groove in the form of chips or shavings without clogging the style. It will also be understood that the essential characteristics of the record are that it should be in the form of lines corresponding to sound waves cut or engraved in a solid material, such as wax or a wax-like composition.

Your question is directed particularly to claims 7, 8, 10, 17, and 18 of this patent and I find that each of the claims refers particularly to the sound record cut or engraved in a solid body or tablet. Claim 7 is as follows:



"7. A sound record consisting of a tablet or other solid body having its surface cut or engraved with narrow lines of irregular or varied form corresponding to sound waves, substantially as described."

The three pertinent characteristics of the record defined by this claim are that it shall be in the form of narrow lines cut or engraved; that such lines shall be of irregular or varied form corresponding to the sound-waves; and that it shall be formed in a tablet or other solid body.

Claim 8 is as follows:

"8. A sound record consisting of a tablet or solid body having its surface cut or engraved with a number of lines of variable cross section, the irregularities or variations corresponding in form to sound waves, substantially as described."

This claim differs from claim 7 only in the manner of defining the irregularities and variations in the line constituting the record.

Claim 10 defines:

"10. The sound or speech ~~in~~ record cut or engraved in a wax or wax-like composition, substantially as described."

Like claims 7 and 8, this claim calls for a record which shall be cut or engraved and unlike them it defines the material of the tablet to be wax or of wax-like composition. Without attempting to define the form of the engraved line which constitutes the record.

Claim 17 defines more specifically the form of the groove though without defining the specific material constituting the tablet further than to say that it is a solid material.

It reads as follows:



"17. The sound record in the form of an irregular groove with sloping walls cut in solid material, substantially as described."

Claim 18 differs from claim 17 only in that it defines the material of the record to be wax or wax like composition.

This claim reads as follows:

"18. The sound record cut in wax or wax-like composition in the form of an irregular groove with sloping walls, substantially as described."

Q.7. Referring now to the patent to Tainter No.341,288

I would ask you to particularly point out the invention or improvement which you find described therein and claimed in claim 37 thereof ?

A.- The patent to Bell & Tainter No.341,214, shows and describes a tablet in the form of a flat disk or strip. The patent to Tainter No.341,288 among numerous other improvements and inventions describes a recording tablet in the form of a hollow cylinder or tube having a recording surface of wax or wax-like composition, preferably a compound or composition of bees wax and paraffin. The advantages of this form of tablet are said to be that it may be very light, while having sufficient stiffness to retain its form and avoid the danger of cracking the wax or wax-like surface of the composition, that it is compact and adapted to transmission through the mails or otherwise, and that it can very readily be placed upon and removed from the holder by which it is supported and rotated in recording and reproducing. The specific form of recording tablet illustrated consists of a hollow cylinder or tube of paper or other suitable material, with the wax or wax-like composition constituting the



recording surface placed upon this backing of paper.

The method of producing the record in a tablet thus formed is identical with that which I have described in connection with Bell and Tainter patent No.341,214, that is, it is cut or engraved in the surface of the wax or wax-like tablet in the form of a narrow irregular line, the irregularities corresponding to sound waves. Claim 37 of this patent is as follows:

"37. A recording tablet consisting of a hollow cylinder provided with a wax or wax-like coating and having a sound record cut in said coating, substantially as described."

This claim differs from claim 10 of Bell and Tainter patent No.341,214 in that it defines the recording tablet as consisting of a hollow cylinder, but like claim 10 of the patent No.341,214, it specifies that the recording surface or coating of the tablet shall be of a wax or wax-like composition, and that the record shall be cut therein.

Q.8. Have you examined the device marked "Complainant's Exhibit Defendants' Duplicate Record" and the drawing marked "Complainant's Exhibit Diagram Defendants' Duplicating Apparatus", which I now hand you ?

A.- I have.

Q.9- Please state whether or not you find that the Exhibit Defendants' Duplicate Record involves or embodies the improvements specified in the claims of the patents in suit, or any of them, and in your answer you may assume that said sound record was made on a duplicating apparatus substantial-



ly like that illustrated by the Exhibit Diagram ?

A.- Complainant's Exhibit Defendants' Duplicate Sound Record embodies the construction defined in claims 7, 8, 10, 17 and 18 of the patent No.341,214 in suit, and also of claim 37 of the patent No.341,288 in suit. Referring first to the claims of patent No.341,214, and taking them in their order as they occur, I find that the device of said exhibit consists of a cylindrical tablet or solid body, and that it has upon its surface narrow lines of irregular or varied form. By placing this cylinder upon a graphophone and submitting it to the action of a reproducer, I find that sounds (musical, orchestral or band production) result from operating the machine, thus demonstrating that the narrow lines of irregular or varied form correspond to sound waves as demanded by claim 7. By examining this groove or line on the surface of the cylinder with a high power glass it may readily be seen that the groove was formed by a tool which cut or engraved the groove upon the surface of the cylinder, and assuming that it was formed upon an apparatus of the character shown in Complainant's Exhibit Diagram Defendants' Duplicating Apparatus, I am enabled to state positively that the groove is cut or engraved in the surface of the tablet. This duplicating apparatus last above referred to consists of two mandrels capable of being simultaneously revolved and upon which cylinders similar to that upon which the record Complainant's Exhibit Defendants' Duplicate Sound Record may be slipped and caused to revolve with the mandrel. If one of these cylinders has upon its surface a sound record cut



or engraved or otherwise formed, as defined in the Bell and Tainter patent No. 341,214, and the other cylinder is a blank tablet, a duplicate record exactly similar to that marked Complainant's Exhibit Defendants' Duplicate Record may be produced by causing a rubbing style similar to that employed in a reproducer to track in the record groove of one cylinder and connecting it to a cutting or graving style imbedded in the surface of the blank tablet, while the record and tablet are simultaneously revolved and the rubbing and cutting styles are advanced longitudinally by suitable mechanism.

Referring now to the Diagram Defendants' Duplicating Apparatus, I find just such a structure, that is, two simultaneously revolved mandrels for supporting the record and the blank tablet, a rubbing style to travel in the groove of the record, a cutting style imbedded in the surface of the blank tablet, and suitable connections between the two styles, whereby the vibrations due to the contact of the rubbing style with the irregular line of the record are transmitted to the graver causing it to cut or engrave in the surface of the blank<sup>tablet</sup> a line of irregular or varied form corresponding to the line which constitutes the sound-record in the master with which the rubbing style is in contact. I find therefore that the Complainant's Exhibit Defendants' Record is cut or engraved in the surface of the tablet. It therefore supplies every condition demanded by claim 7 in that it consists of a tablet or solid body, that its surface is cut or engraved with narrow lines, and that such lines are of



irregular or varied form corresponding to sound waves. It also answers the terms of claim 8, the lines being of variable cross-section and the irregularities or variations corresponding in form to sound waves.

By submitting the material to the action of a cutting style I am enabled to determine that the tablet is formed in a solid body which is wax-like in its properties, that is, which is amorphous and slightly cohesive. I am also enabled to determine that it is a material which has no tendency to clog the style but may be readily removed thereby in the form of chips or shavings, thus demonstrating that it possesses all those essential characteristics of the wax or wax-like tablets which makes it peculiarly suitable for recording sound through the action of a graving style.

I have stated in connection with claim 7 that this exhibit is formed by cutting or engraving the record groove in the surface of a tablet, but neither claim 7 or claim 8 specifies the character of the material composing the tablet. Claim 10, however, demands a sound-record cut or engraved in wax or wax-like composition, and since the record Complainants Exhibit Defendants' Record is a sound record, and since it is cut or engraved, and since as I have shown above the material is wax-like in those characteristics which are essential in a material for a recording tablet, I find that it clearly embodies the structure set forth in claim 10. I would add that this tablet has all the appearance and also the peculiar odor of the common commercial form of tablet which is employed by the Complainant Company in the



manufacture of records under the patents referred to, and as it is amorphous, slight cohesive, and presenting an equal resistance to the cutting style in all directions, thus rendering it easy to smoothly remove the material from the groove in chips or shavings without clogging the style, I have no hesitation in saying that it is composed of a material clearly wax or wax-like in its composition.

I have stated that I find in this exhibit a sound record in the form of an irregular groove cut in solid material. Claim 17 imposes the further condition that the groove shall have sloping walls and by inspecting under a high power glass the groove constituting the sound-record of the exhibit, I have been able to clearly see that the walls of the groove are sloping. I find therefore in this exhibit a sound record in the form of an irregular groove with sloping walls cut in solid material, which is the exact construction defined by claim 17. Claim 18 differs from claim 17 in requiring that the record shall be cut in wax or wax-like composition, and as I have heretofore pointed out that this exhibit is a sound-record, that it is in the form of irregular grooves with sloping walls; that the groove is cut or engraved; and that the material composing the tablet is a wax-like composition, I find embodied in this exhibit the subject matter of claim 18.

Claim 37 of the patent No. 341,288 defines a recording tablet consisting of a hollow cylinder provided with a wax or wax-like coating and having a sound record cut in such coating. I find the exhibit Defendants' Duplicate



Record to be a cylinder, that it is hollow; that its surface or coating is wax-like and that it has a sound record cut in said surface or coating. It therefore conforms to all the requirements of said claim 37 of the patent No. 341,288. I find therefore that Complainant's Exhibit Defendants' Duplicate Record involves or embodies the improvements specified in claims 7, 8, 10, 17 and 18 of the patent No. 341,214 in suit and in claim 37 of the patent No. 341,288, in suit.

I might add that this record in its form, principal properties general characteristics and operation when placed upon a graphophone can not be distinguished from the ordinary graphophone records of commerce.

Adjourned to Friday June 24th., 1898,

at 10 A. M.



Washington, D.C.,

June 25th., 1898.

Met pursuant to adjournment:

Present:

Philip Mauro, Esq. for Complainant.

Howard W. Hayes, Esq., for Defendants.

CROSS-EXAMINATION OF

Mr. Cameron

by Mr. Hayes.

X Q 10 - In your answer to question 6 you speak of copying the original tracing of the phonautograph or other similar instrument by etching, photograving, stereotyping, or otherwise. Can you tell by whom and when such sound tracings were copied by etching, and if so, please do so?

A. My statement was that attempts were made to trace the lines in various ways, among which I mentioned that it was sought to trace a line as in the phonautograph and obtain the desired solid tracing by processes similar to photograving. I understand that it was proposed by the Abbe Carbonnel to etch by acids the record in the surface of copper which had been previously covered by wax and a line traced therein in a manner similar to that traced by the phonautograph in lamp-black. You will observe, however, that my statement only goes to the effect that attempts were made to so obtain a record line without stating that such attempts were successful.



X Q 11 / From what source is your information in regard to Carbonnel's proposed etching derived ?

A. Merely from my familiarity with the literature of the art of recording and reproducing sound. Among other articles bearing in a general way on this subject I would mention an article in the "Telegraphic Journal" for February 1, 1879.

X Q 12 - Do you know on any other publication which speak of this proposed etching, if so, please state what they are ?

A - I do not recall, off hand, publications speaking of the etching in this manner.

X Q 13 - Do you know when or by whom a sound-record made in a soft substance was copied or attempted to be copied by photograving, or by stereotyping, or in any other manner; if so please state fully your knowledge in regard to the matter, and if such knowledge is derived from publications, please state the publications so far as you can recall them or can refresh your memory by reference to the record of previous suits in your possession ?

A - In an article in the French Journal entitled "Kosmos" 1878, is a description of a proposed means for obtaining a "phonogram" or "sound record" by the Abbe Carbonnel, in which it was proposed to employ thick albumen on paper or other recipient, instead of the thin wax applied to



copper in the etching process which I have mentioned in a previous answer. The albumen was employed while soft and was subsequently hardened, and the article states "I harden this by the known method and I thus obtain a stereotyped plate on which the indentations are more or less deep according to the greater or less intensity of the sound. There remains merely to find by search the best vibrating plate for reproducing the sound".

This article discloses a proposed method of obtaining a line in a soft substance and afterwards hardening the same, and it also intimates the use of the hardened plate or substance as a stereotype.

About the year 1878 one Charles Cros described in French patent No. 124,312, a proposed process for obtaining a sound record which was quite long and complicated, but which proposed to first trace a line on a sheet of paper covered with lamp-black, in a manner similar to that employed in the phonograph, and subsequently by a process similar to photogravure and by means also of an etching acid the lines were transferred or attempted to be transferred upon a metal tablet. This discloses in a general way the construction which I had in mind in my answer to question 6 ~~where~~ where I spoke of attempting to obtain the desired line by process similar to photograv<sup>ure</sup>~~ure~~. I might add that a description of this process was published in the French Journal "La Repelle" for December 11th., 1877.

In several publications that appeared about 1879 and



1880, there are descriptions of an instrument known as "Lambrigt's Six Penny Phonograph" which is said to reproduce speech very imperfectly and in which it was said the words could be distinguished only because they were known in advance. Lambrigt's proposed method consisted in taking a surface of stearine, such as a prism of glass or other hard substance coated with stearine, scraping the surface until it was semi-cylindrical, and then after softening the stearine he proceeded with a broad blade, cut out so as to fit the curved surface of the stearine, to indent the stearine by vibrating the curved blade against the surface of the stearine by means of a vibrating diaphragm to which the blade was attached.

This stearine bar thus indented was coated with a surface of plumbago and electroplated; the electroplated coating was then removed from the stearine and a suitable backing of metal was run over the convex surface of the coating, thus forming a matrix or mould. In this mould soft lead wires were pressed with a view to giving the wire the indented form of the mould" The lead wire thus indented and which formed an approximately fair copy of the indented stearine coating, was used as the means for reproducing sound. This lead wire thus formed was referred to in the art as a "record". The article states after having described the preparation surface:

"When all is properly adjusted and the temperature is so arranged as to give the stearine surface the proper degree of hardness to insure the best results, the handle of the instrument is turned and at the same time words are spoken against the diaphragm which immediately set up in it vibrations which are communicated to the plate in style. While this is moving up and down,



following the vibrations of the diaphragm, caused by the voice, the stearine coating of the bar a b is steadily drawn in the direction of the arrow below the vibrating bar, receiving from it a phonogram similar to that produced on the tin foil of an ordinary phonograph.

Lambrigot's entire instrument was regarded merely as an interesting toy and appears to have been merely a means of presenting to the public the principles which had been previously embodied in the Edison Indenting Phonograph. It however presents an attempt to obtain a sound record by a stereotyping process.

Mention is made of this toy of Lambrigot's under the name of the "Six Penny Phonograph" in the journal "Engineering" April 18th., 1879, in the French publication Bibliotheque des Marveilles, published in 1880, and the journal of the Society of Telegraph Engineers in 1879.

X Q 14. What other method or methods have been developed by which this line which you speak of in your answer to question 6, may be copied ?

A - I do not recall at the present moment any other methods that have been proposed prior to the date of the patents in suit.

X Q 15 - In your answer to question 6 you speak of the Edison phonograph as "indenting". What do you mean by the word "indenting"?

A - I used the word indenting throughout my deposition in the sense of embossing and generally have coupled it with the word embossing, that is; I speak of it as "indenting or



embossing", that being the expression which Mr. Edison himself uses in his patent No. 200,521, in line 17 page 1 of his specification. By "indenting or embossing" I mean as Edison clearly meant that the material upon which the vibrating style pressed was bent so as to leave a groove with undulations or sinuosities corresponding to sound waves, the groove being formed however without the removal of the substance of the record tablet but merely by changing the shape of the surface thereof.

X Q 16. Did the grooves formed by recording in the Edison original tin foil phonograph have sloping walls ?

A - When the point of the indenting styles bent the tin foil, it not only affected the tin foil at the exact point where it touched the surface, but it necessarily deformed the same for no inconsiderable distance around the point of the style. In fact this was one of the prime reasons why Edison failed to obtain a correct record of the sound-waves, the tin-foil was bent not only on each side of the style, but also to the front and to the rear of the point upon which it was actually pressing, and this deformed the indentation which had been previously made and which was immediately to the rear of the indenting point. This same action would of course leave a groove with its sides sloping from the bottom upward, especially if a V-shaped style were employed.



X Q 17. What do you take the word "solid" to mean in the patent in suit where it refers to a solid material for the record ?

A - I take it to mean what the word "solid" ordinarily means, and when coupled with the other words of the specification I take it to mean a material which has body enough to permit it to be cut by a graving style and preserve perfectly the form of the groove made therein by the cutting style.

X Q 18 You would consider then any substance of sufficient thickness to have the record cut in it and of sufficient hardness to retain its shape after the cutting, a solid body within the meaning in which that word is used in the patents in suit ?

A - I don't conceive that thickness has anything to do with whether a substance is solid or not, but in connection with the latter part of your question I think it is a fair definition of the term "solid" as used in the patents.

X Q 19 - Do you limit the invention of Bell and Tainter to a record cut in solid material of a wax or wax-like character, or do you consider that it includes solid materials of all character ?

A - I do not conceive that the patent is limited to a record cut in a wax or wax-like material. Claim 7 is for a sound-record cut or engraved in a tablet or other solid body.



X Q 20 - You say, in answer to question 9, that the tablet submitted to you has the peculiar odor of the tablet ~~made~~ made by the Complainant Company. Do you know what substances the tablet employed by the Complainant Company is made of, and if you do will you please state them ?

A. I could not undertake to give the formulae employed by Complainant in the manufacture of the tablets referred to.

Cross-examination concluded.

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Present:

Anthony Pollock, Esq., for Complainant.

AND THEREUPON, PHILIP MAURO, a witness on behalf of Complainant, being first duly sworn, deposes and says, in answer to interrogatories propounded by Mr. Pollok, as follows:

Q.1 - Please state your name, age, residence and occupation ?

A - Philip Mauro; age, 39 years; residence Washington, D.C; occupation, lawyer. I am one of the firm of Pollok & Mauro, counsel for Complainant.

Q.2 - State what knowledge you have had of the two letters patent involved in this suit and of the litigation upon them ?

A - I was well acquainted with Alexander Graham Bell Dr. C.A. Bell and Prof. Sumner Tainter, who composed the Volta Laboratory Association, during the whole period of the existence of that association; that is from 1881 to 1885 inclusive, and I was frequently at the Volta Laboratory during those years when the inventions covered by these patents were being developed. I first saw and witnessed the operation of the complete graphophone in the year 1884, that is the year before the applications for these patents were prepared and filed. The instruments that I then saw were both in the disk form and the cylinder form; that is to say one form made records upon flat tablets of disk shape, and the



other upon cylindrical tablets. The recording material was a composition of paraffin and white bees wax, and these instruments recorded articulate speech and other sounds with fidelity.

I was an employee in the office of Anthony Pollok, who was solicitor for the patentees in procuring these patents, and have participated in the proceedings in the Patent Office.

I have been in charge of all the litigation in which these patents have been involved and believe that I am thoroughly familiar with every step and detail of all ~~of~~ the suits.

In 1888, two years after the issue of the patents and at a time when graphophones had gone into commercial use to a considerable extent information reached the Volta Graphophone Company, which was at that time the owner of these patents, that Mr. Edison was about to put upon the market a talking machine which operated by making engraved records of sounds in wax or wax-like material, to which instrument he gave the same name "phonograph" which he had used to designate the tin foil or embossing machine invented by him in 1877.

Preparations were immediately made for beginning a suit, the bill of complaint was drawn, and numerous affidavits were prepared in support of a motion for preliminary injunction. At this time, however, Mr. Jesse H. Lippincott, who was the sole sales agent of the American Graphophone Company, licensee under the patents in suit, bought out all the rights and patents for this country of the Edison interests, invest-



ed them in a corporation organized for that purpose and known as the North American Phonograph Company. An arrangement was thereupon made with the American Graphophone Company whereby the talking machine and appliances made by the Edison Phonograph Works and sold under the trade designation of Phonographs, were licensed under the patents in suit so far as they were put upon the market by or through said Lippincott. As he was the sole medium for marketing these devices and continued to be for a number of years the patents were universally respected and no occasion for litigation arose until 1893. Between the dates I have mentioned the North American Phonograph Company, through extravagance and improvident management, became insolvent, as did Lippincott individually, and it is generally understood that his mind also became impaired. At all events he went out of business and as the Edison Phonograph Works continued the manufacture and sale of the patented devices, infringement suits were begun in February 1893 against that Company. Thy goods were distributed through a number of dealers in different parts of the country, and suits were also begun against these dealers for their participation in the infringement. Among the distributing agents of the product of the Edison Phonograph Works against whom suits were brought were the Columbia Phonograph Company, the United States Phonograph Company (the present defendants), the firm of Walcutt and Leeds, in New York, and others. Attempt was made to make a test case of the suit against the Columbia Phonograph Company. This suit and all the others were defended by Mr.



Edison's counsel, at that time Messrs. Dyer & Seely, afterwards Messrs. Dyer & Driscoll, and I have been informed and have no doubt it was a fact that all these suits were defended at Mr. Edison's expense. The suit against the Columbia Phonograph Company, after some testimony had been taken by Complainant, completing its prima facie case, was allowed to go by default.

Complainant then took up actively the suit against the Edison Phonograph Works, with the design of obtaining a trial therein of all the issues. This suit was defended, first upon a plea averring a license in the Edison Phonograph Works under the patents in suit. A large record was made up in support of this plea and was argued before Judge Acheson, who decided that the plea of license was not established.

The defendants then took proof on the issues of novelty, originality, utility etc. and the case was argued on voluminous proofs before the late Judge Green in September 1896. Judge Green's death occurred before he rendered an opinion. I began at once making efforts to arrange for a hearing before another Judge in that Circuit, but there was prospect of considerable delay owing to the fact that Judge Dallas was in poor health and Judge Acheson overwhelmed with judicial business.

In this interval negotiations were opened by the Edison Phonograph Works for a reestablishment of the license which it had enjoyed and operated under during the Lippincott regime. These negotiations resulted in a license which was



executed in December 1896. This license or agreement effected a settlement of all previous infringements arising out of the manufacture of the Edison Phonograph Works and of the use and sale by others of the product of that concern. Consequently the suits which were brought against dealers in that product were discontinued, including the suit against the United States Phonograph Company and that against Walcutt and Leeds. Up to this time there had been no manufacture adverse to the patents in this country except that of the Edison Phonograph Works during the period not covered by its license, which manufacture was very small in quantity. In January 1896 one E.H.Amet brought out a small machine adapted to reproduce sounds from a graphophone sound-record. He was sued by Complainant and defended by Messrs Monday, Evarts and Adcock of Chicago, where the suit was brought, who availed themselves of the answer which had been filed in the New Jersey cases. The defendants introduced the prior United States and British patents of Edison, the Six Penny Phonograph of Lambrigt, and upon these and other prior patents and publications attacked the novelty of the inventions, particularly in respect of the reproducing mechanism. The novelty of the sound record was involved and was considered by the Court, but the evidence, while presenting essentially the same facts as had been presented in the New Jersey cases, was not so full or elaborate. Judge Grosscup sustained claims 22 and 24 of the patent No.341,214, which included the sound record as one element, his decision was reported in 74 F.R.789, and the decree drawn by himself is

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reported in the same volume at page 1008.

In the Fall of the same year, 1896, Walcutt in New York began infringing by the manufacture of blank tablets for sound records and suit was begun against him for that infringement in October 1896. Later in the same year it was ascertained that said Walcutt was making duplicate sound records, that is to say, transferring by mechanical means the engraving from an original record to a blank tablet, thereby producing an engraved copy of the original. Testimony was taken on both sides in these suits on the issues both of novelty and infringement and on the question whether the recording material in use at the present day is within the terms of the patent, and on the issue as to whether the production of duplicate sound records by apparatus composed essentially of two phonographs mechanically connected, such phonographs being licensed instruments, was an infringing manufacture. Both these suits were decided by Judge Wheeler, January 15th., 1898, sustaining the patents and finding that defendants had infringed. On March 25th., 1898, a further opinion was filed by Judge Wheeler upon a motion to punish defendants for contempt. I produce and offer in evidence copies of these opinions.

In the latter part of 1897 information was received of unauthorized manufacture of duplicate sound-records by one Jones in Chicago and by the Western Phonograph Company of the same place. Bills of complaint were filed and motion for preliminary injunction made and decided by Judge Grosscup. I produce a copy of his opinion in these cases.



Subsequent to Judge Wheeler's opinions in the Walcutt & Leeds cases it was learned that a corporation had been organized under the name of Walcutt & Leeds, Limited, of which George E. Tewksbury, one of the defendants herein, owned the controlling interest, and in which Walcutt and Leeds were incorporators and directors. A bill of complaint was filed in New York against this concern and a motion for preliminary injunction was made before Judge Lacombe. This motion was resisted, an affidavit being presented quoting at length from the record in the ~~old~~ <sup>old</sup> New Jersey cases. The motion was granted by Judge Lacombe and his orders are dated March 26th., and April 6th., 1898, respectively.

In the latter part of 1896 suit was begun in the Southern District of New York against L.L. Leeds and L.W. Baldwin for infringement of patent No. 341,214, by the manufacture of a machine known as the "metaphone" or "echophone" which was very similar to the Amet machine. A very elaborate defense was made composed in large part of the record in the old New Jersey cases, the answer filed by the Defendants in this New York case being substantially a copy of the answer in said New Jersey cases. Every defense was set up and supported by proof. The depositions of Thomas A. Edison, Charles Bachelor given in the New Jersey cases and material portions of Walcutt's deposition therein were introduced bodily as were Edison's U.S. and British patents, the French patents and publications of Charles Gross, and the Lambrigt and Carbonel publications. The defense that the so-called metallic soap blank is not a wax-like material was presented



with great elaboration and also the proposition that the graphophone as originally put on the market was not a practical or useful instrument. In fact I know of nothing worthy of consideration or that could by any possibility have a bearing upon the validity or scope of the patent No.341,214 in suit that was omitted from this case. This cause was argued before Judge Shipman for two days in April 1898, by Messrs.William Houston Kenyon and A Parker-Smith for the defemants, who also filed very long and very elaborate briefs, fully discussing all the points in the case. Judge Shipman's opinion was filed June 19th.and I produce a copy of it. In my review of the litigation I have omitted to mention suits brought against David E.Boswell, in Chicago, against the National Ediphone Company, in Chicago, and against the Receiver of the North American Phonograph Company in New Jersey. None of these cases were very vigorously defended, but in all of them decrees or injunctional orders in favor of complainant were granted.

Direct examination closed.



Cross-examination of

Mr. Mauro

by Mr. Hayes.

X Q 3 - In answer to question 2 you say that in 1888 preparations were begun by the Volta Graphophone Company to begin suit against Mr. Edison for putting out his phonograph, and that a bill of complaint was drawn and numerous affidavits prepared in support of a motion for a preliminary injunction. Have you that bill of complaint and those affidavits. If so please produce them?

A - I believe that a draft of that bill of complaint and drafts of some of the affidavits are among the papers in this office. I remember handling them at the time testimony was taken in the New Jersey cases, and one of them, namely, the affidavit of Mr. Berliner, was introduced as an exhibit in connection with his deposition in that case. Just where the other papers are I am unable to say at this moment, but I should not in any event produce them, unless directed by the Court to do so. The affidavit of Mr. Berliner to which I have referred is printed in the New Jersey record beginning at page 146. I have no objection, of course, to putting in a copy if counsel for Defendants desires.

Cross-examination of Mr. Mauro concluded.

Complainant's counsel offers in evidence uncertified copy of assignment dated March 29th., 1887, by C.A. Bell and Sumner Tainter to the Volta Graphophone



Company, to be marked "Complainant's Exhibit Assignment No.1",

Copy of assignment dated March 29th., 1887, by Sumner Tainter to Volta Graphophone Company, to be marked "Complainant's Exhibit Assignment No.2",

And copy of an assignment dated January 24th., 1893 by Volta Graphophone Company to American Graphophone Company, to be marked "Complainant's Exhibit Assignment No.3".

And it is stipulated and agreed between counsel that the said copies, subject to correction of any errors that may be found therein, may be received in evidence with the same force and effect as if the originals were produced with due proof of execution and delivery. Complainant's counsel agrees to produce for the inspection of Defendant's counsel at any time before the closing of the proofs herein, upon reasonable notice, the originals of said assignments.

Complainant's counsel also offers in evidence the sound record referred to in the testimony of the witness Cameron to be marked "Complainant's Exhibit Defendant's Duplicate Sound Record" and it is stipulated and agreed that said exhibit correctly represents the duplicate sound records manufactured by Defendants prior to the filing of the bill of Complaint herein.



Complainant's counsel also offers in evidence an original sound record to be marked "Complainant's Exhibit Defendants' Original Sound Record"; also the diagram referred to in the testimony of Mr. Cameron to be marked "Complainant's Exhibit Diagram Defendants' Duplicating Apparatus".

And it is further stipulated and agreed for the purpose of evidence herein that the said duplicate is a copy of the said original record and was made from said original by means of an apparatus substantially like that represented by Complainant's Exhibit Diagram.

Defendant's counsel states that the duplicating apparatus in question is and has been the property of the defendant the United States Phonograph Company, and the said original and duplicate records were made by its employees and this stipulation is not to be taken as an admission that the Defendant George E. Tewksbury is connected with the United States Phonograph Company in such a way as to make him responsible for its acts, so far as this suit is concerned.

Complainant's counsel offers in evidence uncertified copies of opinions and orders referred to in the deposition of Mr. Mauro to be marked as indicated by the following titles:

"Opinion of Judge Wheeler in the Walcutt Case."

"Opinion of Judge Wheeler in the Walcutt & Leeds case"

"Opinion of Judge Grosscup in the Jones and Western



Phonograph Company cases".

"Orders of Judge Lacombe in the Walcutt and Leeds Limited Case."

"Opinion of Judge Shipman Leeds & Baldwin Case".

And it is stipulated and agreed that said copies subject to correction by counsel for either side, may be received and read in evidence with the same force and effect as if duly certified".

"It is further stipulated and agreed that uncertified official copies of U.S. Letters patent and blue-book copies of British patents may be used by both sides with the same force and effect as certified copies.

It is further stipulated and agreed that the direct testimony of the witnesses that have been examined for Complainant and the Exhibits introduced in the testimony in the case between the same parties upon patent No. 341,287, are made a part of the testimony in this case.

Prima facie proofs closed.



Oct 15/98

New York September 30, 1898

UNITED STATES CIRCUIT COURT  
District of New Jersey

-----x  
: AMERICAN GRAPHOPHONE CO. :  
: : In Equity  
: -against- : on Patents 341,214  
: : and 341,288.  
UNITED STATES PHONOGRAPH CO et al:  
: :  
-----x

Testimony taken on behalf of the Defendant, the  
United States Phonograph Co. in the above cause, before  
S.D. Oliphant, Esq. Standing Examiner, pursuant to notice.

APPEARANCES: On behalf of the Defendant:

Howard W. Hayes, Esq.

A. Parker-Smith, Esq.

On behalf of the Plaintiff:

S.C. Edmonds, Esq.

Charles A.L. Massie, Esq.

JOHN C. ENGLISH, a witness produced on the part  
of the Defendant, the United States Phonograph Company,  
being duly sworn according to law, on his oath, deposes  
and says:



Q1. Please state your name, age, residence and occupation.

A. John C. English, age 43, occupation pharmaceutical chemist, residence, 125 West 90th. Street, New York City.

Q2. Have you ever had any connection with the phonograph business so called, and if so, please state when, and under what circumstances such connection began?

A. I first became acquainted with Mr. Edison a number of years ago when he had his laboratory in New York City, in the factory of Bergman & Co. at 17th St. and Avenue B. He was then a customer of Eimer & Amend at 18th Street and 3rd Ave. ~~with~~ by whom I was employed. Our acquaintance continued after that until I think during the year of 1887 or 1888, when having received an offer from Messrs. Queen & Co. of Philadelphia, dealers in optical goods, chemical apparatus, etc. I found it necessary to stay in Philadelphia for several months in my efforts to come to an understanding with Messrs. Queen & Co. and while there, Mr. Edison made a call with the object of purchasing electrical test instruments. I suggested to him the desirability of placing his order for his new laboratory for chemical apparatus, with Messrs. Queen & Co.



This he was willing to do if I controlled the matter. Having failed to make a satisfactory arrangement with Messrs. Queen & Co. I returned to New York bringing with me the orders of Mr. Edison, and at his suggestion, placed those orders to the best advantage, and for which I received a commission. This arrangement continued for some months when Mr. Edison offered me a position upon salary at the laboratory at Orange, whereafter a short time I also became buyer for both the laboratory and phonograph works on joint account. This arrangement continued for some months, when I was appointed Manager of the Phonograph Works.

Q3. State the approximate date of your first connection with the Edison Phonograph Works and how long it continued and what subsequent experience if any in the business you had?

A. I was appointed Manager of the Phonograph Works early in 1889. I had previous to that been in the actual employ upon salary of Mr. Edison for about one year. My duties as buyer brought me into general contact with what was being done at both the Phonograph Works and the Laboratory from the commencement of the Phonograph Works. I left the Edison Phonograph Works in the spring of 1890,



and immediately took the position of Superintendent of the New York Phonograph Co. at 257 Fifth Avenue, remaining with them for possibly six months, after which time I began experimenting upon time recording machines, and upon completion of my experiments, I organized a Company for their manufacture.

Q4. Did your connection with Mr. Edison and the Phonograph Works afford you information as to the materials that were employed for blanks on which the phonograph records were made, and the experiments if any, relative thereto?

A. From the time that Mr. Edison made the arrangement with me for the purchase of his material upon commission, which was before the commencement of the Phonograph Works, and while he was experimenting at East Newark, I received written orders for the purchase of material which I knew subsequently was used for making experimental blanks for use on the phonograph. After entering his employ as buyer, all orders to the best of my knowledge for such material, were placed under my supervision, and all experimental work done at the laboratory was done in private room but by employees known to me and all material issued for these experiments were upon requisition and the



cost of such material was affixed by me to enable Mr. Edison to ascertain or properly charge up the cost of individual experiments. After becoming Manager of the Phonograph Works, I found it necessary to properly control the supply of material, to also do the buying, and this enabled me with my knowledge, especially of such materials as would be used in blank making, to distinguish the difference between what would be used for making a blank and what would be used in construction of the machine. It was the policy of Mr. Edison to cover the formula of the cylinder compound with as much mystery as possible, and this I found in my experiments after leaving Orange, to have been a wise move upon his part, as while my knowledge of each ingredient which entered into this chemical compound, it did not enable me to make the preparation with out very extensive experiments. I found upon subsequent investigation, that it was not merely a mechanical mixture but a definite compound.

Q5. Did the finished blank and records put out by the Edison Laboratory or Phonograph Works, come under your observation to any extent?

A. As Manager of the Phonograph Works I found that owing to the complex character of the product, that I



could not conveniently and safely employ a superintendent, and I assumed these duties myself, and for this reason it brought me into constant contact with every department and as at the time I became Manager of the Phonograph Works, the cylinder question was not a settled one, it became necessary for me to devote a great deal of time to this subject. The blank first used was one composed principally of white wax, containing a small percentage of commercial Carnauba wax. This blank did not prove commercially a success, and was abandoned when the soap blank had been found successful. The first white wax blank was called a wax blank because it was recognized by those using it, as being of wax, or partially of wax.

Q6. You have spoken of a soap blank, please explain what that was?

A. The word "soap" is used in this connection not that the blank is a soap in the general sense of the word, because washing soaps are stearates, containing a percentage of water from 30 to possibly 50 percent, while the Edison blank is a double stearate of soda and another metal made from the purest and best material which is essential and is anhydrous, that is, without water. A stearate of this description, if properly made, is not affected by moisture, and is a definite chemical compound.



hard and brittle, and like most all chemical salt, very different in character and appearance from the individual elements themselves.

Q7. Please state what the constituents of the Edison soap blank were at that time, so far as you knew, and disclose the same without violating any confidence reposed in you as the result of your employment?

A. The preparation or compound was one of stearic acid and caustic soda, and acetate of aluminum, to which a very small percentage of white ozokerite was added, which I afterward found as a result of my experience, was rather more to bind this exceedingly dry and brittle material together than for any other practical purpose.

Q8. Are you familiar with the substance of which the present commercial phonograph and graphophone record blanks are made?

A. They are essentially the same as the blanks made as above described. There were chemical difficulties in the use of acetate of aluminum which caused it to be abandoned, but it did not change the general chemical character of the formula. It was merely a matter of economy and avoided a scratchy character that was liable to occur in some makes of acetate of aluminum, but to be brief



there has been little or no change in the formula that can be observed by comparison of samples which I have made at different periods from the time of the first blank until the present time.

Q9. During the period covered by your employment by Mr. Edison and by the New York Phonograph Co. or thereabouts, did you have occasion to become acquainted with other talking machine records and blanks put out by other companies?

A. Yes, the Graphophone Company, the Complainant in this suit, made a blank of wax or waxlike material, with an inner lining of paper, at the time of the organization of the North American Phonograph Co. but to the best of my knowledge this blank was little used owing to mechanical imperfection of the graphophone, and to the worthlessness of the waxlike blank which they made. The North American Co. very quickly abandoned this machine and blanks, and from that time on, made and sold only the phonograph. After leaving the employ of the phonograph works, and during my connection with the New York Phonograph Co. I made numerous experiments upon the Graphophone, as I understood that a satisfactory improvement would be acceptable to the Graphophone Co. and possibly might prove profitable



to me. I found that the tubular cylinder with its soft waxlike covering, was too elastic, as the first imperfection; secondly, that the waxlike nature of the material was such that it was practically impossible to make a commercial success of what they had by means of ~~one~~ mere mechanical changes; the records were faint, could not be reproduced satisfactorily but few times, and of absolutely no value whatever, for making musical records.

Q10. Was there any other use than the carrying of musical records to which sound recording materials might be put in a commercial way, and if so, please explain the difference, if any, in the characteristics of a successful ~~xxx~~ material for the various purposes?

A. There were a limited number of machines in use for commercial purposes, as a mechanical stenographer, but in all my experience in the business, I never saw any other machine except the phonograph so used. The Edison cylinder was commercially a success for this purpose, because its surface could be shaved off after use, and used again, very many times. At least 50 or 60 times with proper care. This could not be done with the Graphophone cylinder as its use was limited to one record only, and at the price charged for blanks, it made it absolutely



a failure for commercial purposes.

Adjourned for Luncheon.

Q11. Was it or was it not a fact that a recording blank might be capable of partial success for use for the taking of dictation, and be useless for the making of musical records?

A. It is a fact that for commercial purposes the graphophone record reproduced sufficiently loud for commercial purposes if ~~used~~ reproduced from only a few times, but for the purpose of musical records it was absolutely a failure, as the reproduction of sound depends upon greater weight being placed upon the record, if intended to reproduce musical sounds.

Q12. Were the Edison phonograph blanks and the Graphophone Company's paper backed cylinders capable of interchangeable use on the respective machines put out by the two concerns, or what was the fact in that regard?

A. As the machines were made in the early days, the cylinders of the two machines were not interchangeable. The Edison cylinder being made with a taper interior while the graphophone cylinder was ~~streaked~~ straight on the inner side. After the Graphophone Company resumed



business on its own account, I saw machines of theirs which had been placed upon the market for musical purposes that had a separate mandrel fitted to their old machines which enabled them to use the Edison ~~blank~~ blank. They had also changed their reproducer and reproducer point to conform to the Edison standard. This made the graphophone practically a phonograph.

Q13. Did you have any dealings with any person connected with the complainant company in regard to this matter of making records or blanks on which sound records were to be made after leaving the Edison Phonograph Co.?

A. In 1893 I was approached by Mr. Clephane, a gentleman who I knew had been intimately connected with the Graphophone interests, and who I supposed, from statements made, to be more or less intimately connected with the Graphophone Company at that time. Mr. Clephane wanted to know if I could furnish a formula for the Edison cylinder material, which he said the Graphophone Co. needed very much as their success depended upon the use of the Edison cylinder, and for which he said the Graphophone Company would pay a very large sum. He said that the machines that they were then putting out were made to use the Edison cylinder, but that they depended for their supply



of blanks upon purchasing them through the Columbia Phonograph Co. or upon remelting such broken Edison cylinders as they could get. As a result of this interview with Mr. Clephane he brought me into communication with Mr. Macdonald, the Manager of the Graphophone <sup>Company's</sup> factory at Bridgeport. The result of my seeing Mr. Macdonald or corresponding with him, was that he reiterated the statements of Mr. Clephane, and also said that they had been working for a very long time to duplicate the Edison material and had utterly failed to do so, and that he had tried various expedients of trying to get the formula through Edison employes, but had not succeeded, not knowing just who to approach. The result was that I told Mr. Macdonald that I thought I knew ~~sufficiently~~ enough to enable me to commence experimenting upon the subject, and we entered into a deal that the formula would be purchased if I produced satisfactory samples. The understanding at that time was that the formula was to be purchased by the Graphophone Company. I made experiments which proved satisfactory, and samples were submitted, some of which were very satisfactory and others were not just as he wanted them. I afterwards found that these difficulties were due to the variable qualities of material used.



I did not quite solve the problem at that time and stopped experimenting until the following year, 1894, when I again commenced my experiments and produced more uniform results due to a better source of supply of materials used. When I resumed my experiments Mr. Macdonald gave me to understand that the Company had set aside \$2000 for the purchase of a formula, but after producing satisfactory samples, and they having been approved of by Mr. Macdonald, he then informed me that he had in the meantime found a western chemist who had furnished him samples, and that while they were satisfactory he would prefer dealing with me, and that the Company had decided not to make the purchase, and to strengthen his position with the Company, he would purchase the formula himself for \$500. and as I had been to some considerable expense in this experimental work, I thought it better to take the \$500 rather than be out of pocket. I made an agreement with Mr. Macdonald to meet me in the city of New York and make for him a sample lot of about 25 lbs. which I did in his presence, receiving a check from him for the sum of \$500, and in return introduced him to sources of supply for the materials that I had used in the experiment.



Q14. I hand you here a number of letters and documents. Please state whether or not you recognize the same and if so, what bearing, if any, they had on the subject matter of your last answer, embodying in your answer the text of such ~~letters~~ of the documents as may be letters.

A. The letter marked "Exhibit A" signed by James C. Clephane, was one written to me upon the subject matter of my last answer, in which he says: ~~"Would like very~~

~~much~~ "Room 19, 258 Broadway, May 29, 93.

Dear Mr. English:

Would like very much to see you at my office on a matter of mutual interest.

Truly,

James C. Clephane."

This was to call my attention to the matter of the possibility of my being able to reproduce the Edison cylinder material, and I think was the first communication upon the subject of my deal with them.

The second letter marked "Exhibit A2":

"American Graphophone Company, Factory, Bridgeport, Conn.  
T. H. Macdonald, Manager.

Bridgeport, Conn. June 10, 1893.

Mr. J. C. English,

34 Frankfort st. New York.

Dear Sir:

The cylinder arrived O.K. I have tried it on the phonograph a number of times. It does not work very well. The material seems too tough. It is not sufficiently friable to clear itself before the recording needle and the consequence is a chatter, and poor record. The color and



texture are good. It seems to lack a sufficient hardness, if I may so term it, to give a good record.

Yours truly,

T.H.Macdonald."

The third letter marked "Exhibit D".

"American Graphophone Company Factory, Bridgeport  
Conn. T.H.Macdonald, Manager,

June 23, 1893.

Mr. J.C. English,

32 Frankfort, St.

Dear Sir:

Your proposition has been submitted to the parties interested with me. Before doing anything they desire a somewhat fuller test than we have yet made. Will you make for us one dozen cylinders of your best composition, carefully filtered, so that we can give them an extended test with music, etc.? This will make the matter a little better I think, and render negotiations clearer.

Yours truly,

T.H.Macdonald."

The fourth, an Adams Express receipt marked "

"Exhibit C", a receipt from the Adams Express Co. dated

New York June 25, 1893, for one box marked T.H.Macdonald,

Bridgeport, Conn. the contents of which were cylinder blanks sent by me for inspection.

The fifth, a contract marked "Exhibit D".

"Executed in duplicate.

The American Printing Press Company

Room 19, 258 Broadway,

New York, June 30, 1893.

This memorandum of agreement entered into this 30th day of June 1893, between J.C. English, party of the first part, and James O. Clephane, party of the second part, Witnesseth: That in view of the party of the second part bringing together the representative of the American



Graphophone Company and the party of the first part, and also agreeing to use his influence with the officers of the said Graphophone Company to further certain projects of the party of the first part in connection with the Graphophone enterprise, the party of the first part agrees in the event of an arrangement being made between the said Graphophone Co. and the party of the first part to furnish material for making cylinders, or the formula for the same, to pay to the party of the second part, one fourth of all moneys in the shape of cash or royalties as such may be received by the party of the first part.

This agreement to apply if said party of the first part shall have some other party substituted in his place in the formal agreement with the American Graphophone Co.

(Seal)

J.C. English,  
Party of the first part.

(Seal)

James C. Clephane  
Party of the second part.

After having furnished samples to Mr. Macdonald, with which he seemed to be satisfied, Mr. Clephane had an interview with me and feeling satisfied that the deal would be consummated upon a basis that would pay a large profit, he and I entered into this memorandum of agreement.

The sixth, a letter marked "Exhibit E":

"The American Printing Press Company,  
Room 19, 258 Broadway, New York.

June 30, 1893.

Dear Mr. English:

Mr. Macdonald writes me as follows:

'The last batch of cylinders seems to be all that is necessary. They are so much like the Edison that I cannot tell them apart when I once mix them up.'

This looks well. I will probably not get to Bridgeport this week as my party writes he will not be able to be here this week. I leave for Washington on Tuesday night to be gone two or three days. Truly,

Jas. C. Clephane .



Please sign the enclosed in duplicate and return me one."

This letter refers to contract marked "Exhibit B". It was after this time that I suspended my experimental work partially due to want of time from my business as President and Manager of the Columbian Time Recording Co. and possibly to give the matter more study. The latter part of the following year 1894, I continued the experimental work and produced results which concluded the deal with Mr. Macdonald. In furnishing Mr. Macdonald this formula, while the results were extremely satisfactory, it seems that he had trouble in manufacturing cylinders, and I am led to believe from such correspondence as I had with him, (I think that most of this correspondence was over the telephone) that his difficulties were due to the use of not enough acetate of aluminum, and in consequence he had troubles such as the Edison Phonograph Works have experienced at a later date, in that the surface molded, or in other words there was a thin film formed upon the surface which has been claimed to cause records to reproduce more scratchy than when this film did not form. That result may have been due to Mr. Macdonald's want of knowledge, or to faulty material which he used, because as I have said, the Edison Phonograph Works about two years



ago were annoyed with similar results. Sometime after Mr. Macdonald had his trouble, he wrote me two letters, in rather bitter tone, claiming that I had not furnished him the same formula as had been used at Orange, notwithstanding that I had furnished him samples of cylinders and cylinder material made in his presence, and matters stood in this position until about August 28th. 1896, I received a letter which is here introduced as letters marked "Exhibit F".

"Bridgeport, Conn. August 27, 1896.  
Mr. J. C. English,  
838 8th Ave. New York.  
My dear Sir:

Sometime ago I wrote you two letters which I am now satisfied did you gross injustice. I am exceedingly sorry that momentary difficulties and disappointments and untrustworthy information, should have led me to address you as I did. I therefore desire to withdraw them, and frankly assure you that I am sorry they were written.

Very truly,

T. H. Macdonald."

Defendant's Counsel offers in evidence the several documents identified by the witness in his last answer and the same are marked in accordance with the witness's designation of them as follows:

Defendants' Exhibit A. Clephane Letter of May 29/93

Defendants' Exhibit A2, Macdonald Letter of June 10, 1893.



Defendants Exhibit B, Macdonald Letter of June 23, 1893.

Defendants' Exhibit C, Express Receipt.

Defendants' Exhibit D, Clephane Contract.

Defendants' Exhibit E, Clephane Letter of June 30, 1893.

Defendants' Exhibit F, Macdonald Letter August 27, 1896.

Q15. Are you familiar with the material of the sound records now and recently put upon the market by the Complainant American Graphophone Company?

A. From my knowledge upon the subject of soap cylinder materials, and it is one with which I am very familiar, I would say that without doubt, with nothing more than some slight variation which would not be chemically different that the cylinder placed upon the market now by the Graphophone Company, is practically identical with that made by the Edison Phonograph Works.

Q16. How does it compare with the material which you submitted to Mr. Macdonald and turned over to him in 1894, and made in accordance with the formula which you worked out?

A. It is practically identical.



Common Zephronia

U. S. Photograph Co. of N.

Exhibit A. Sept. 30-98. D. F. McFarland.

From 19, 25 & 30  
May 29/93

Dear Mr. English:

Would like to send  
you a number of photos  
of the same.

Very  
Respectfully,  
J. J. McFarland

N. J. McFarland, Esq.  
Southern Ave. of New York  
American Express Co.  
New York & Chicago  
Chicago, Ill.



ALL BUSINESS LETTERS SHOULD BE ADDRESSED TO THE COMPANY.

S. M. BRYAN,  
PRESIDENT.

CHAS. J. BELL,  
V.-PRES'T AND TREAS.

A. H. SPEAKE,  
SECRETARY.

CHAS. FLINT,  
GEN. MANAGER.

DIRECTORS:

SAM'L M. BRYAN.  
CHAS. J. BELL.  
GARDINER G. HUBBARD.  
CHAS. S. TANTER.  
EDW. D. EASTON.  
WM. B. GURLEY.  
JOHN H. WHITE.  
R. O. HOLTZMAN.  
JAN. A. HATES.

AMERICAN GRAPHOPHONE COMPANY,

FACTORY: BRIDGEPORT, CONN.

T. H. MACDONALD, MANAGER.

PRINCIPAL OFFICE:  
619 14TH STREET, N. W.,  
WASHINGTON, D. C.

Bridgeport, Conn. June 10, 1893.

Mr. J. C. English,  
#34 Frankfort St.,  
New York.

Dear Sir:-

The cylinder arrived OK. I have tried it on the phonograph a number of times. It does not work very well. The material seems too tough. It is not sufficiently friable to clear itself before the recording needle and the consequence is a chatter, and poor record. The color and texture are good. It seems to lack a sufficient hard dryness, if I may so term it, to give a good record.

*T. H. Macdonald*  
Yours truly,

*American Graphophone Co.*

*vs*  
*vs Phonograph Co et al*

*Exhibit A<sup>2</sup>. Sept. 30-98 - L. F. Webster*



American Graphophone  
U. S. Phonograph Co et al

Exhibit B. Sep. 20-98  
L. J. Macdonald

ALL BUSINESS LETTERS SHOULD BE ADDRESSED TO THE COMPANY.

S. M. BRYAN,  
PRESIDENT.

CHAS. J. BELL,  
V.-PRES'T AND TRAS.

A. H. SPEAKE,  
SECRETARY.

CHAS. FLINT,  
GEN. MANAGER.

DIRECTORS:

SAM'L M. BRYAN,  
CHAS. J. BELL,  
GARDNER G. HUBBARD,  
CHAS. S. TANTER,  
EDW. D. BASTON,  
WM. B. GURLEY,  
JOHN H. WHITE,  
R. O. HOLTZMAN,  
JAS. A. BATES.

AMERICAN GRAPHOPHONE COMPANY,

FACTORY: BRIDGEPORT, CONN.

T. H. MACDONALD, MANAGER.

PRINCIPAL OFFICE:  
619 14TH STREET, N. W.,  
WASHINGTON, D. C.

B

June 23, 93  
Mr J. C. English  
32, Frankfurt St.

Dear Sir:

Your proposition has been sub-  
mitted to the parties interested with me.  
Before doing anything they desire a some-  
what fuller test than we have yet made.  
Will you make for us one dozen cylin-  
ders of your best composition, carefully  
fitted, so that we can give them an  
extended test with music, etc.? This  
will make the matter a little better  
I think, and render negotiations clearer.

Yours truly

J. H. Macdonald

N. S. Chic. Court.  
Southern Dist. of N.Y.  
American Graphophone Co.  
Loring L. Leeds. }



American Graphophone Co

vs  
Phonograph Co et al

Exhibit C - Sep. 30 - 98

L. F.  
Notary Public

Principal Office,  
59 BROADWAY

BRANCH OFFICES,  
684 Broadway,  
12 West 23d Street,  
2 East 42d Street,  
309 Canal Street,  
122 West Broadway.  
DEPOT,  
Jersey City, N. J.

**ADAMS EXPRESS COMPANY,**  
Great Eastern, Western and Southern Express Forwarders. **C**

No. 180 (Not Negotiable.)

New York, June 26 1893

RECEIVED OF *J. C. English*  
*One Box* Value

For which this Company charges

Marked

*T. H. McDonald*

*Am Graphophone*

*Bridgeport et*

Which is mutually agreed is to be forwarded to our Agency nearest or most convenient to destination only, and there delivered to other parties to complete the transportation. The part of the consideration of this contract, and it is agreed, that the said Express Company ARE FORWARDERS ONLY, and are not to be held liable or responsible for any loss or damage to said property while being conveyed by the CARRIERS to whom the same may be by said Express Company entrusted, arising from the dangers of Railroads, Ocean or River Navigation, Steam, Fire in Stores, Depots, or in Transit, Leakage, Breakage, or from any cause whatever, unless, in every case, the same be proved to have occurred from the fraud or gross negligence of said Express Company or their servants; nor, in any event, shall the holder hereof demand beyond the sum of FIFTY DOLLARS, at which the article forwarded is hereby valued, unless otherwise herein expressed, or unless specially insured by them, and excepted in this receipt, which insurance shall constitute the limit of the liability of the said Express Company.

And if the same be entrusted or delivered to any other Express Company, or Agent, (which said Adams Express Company or hereby authorized to do), such Company or person as selected shall be regarded exclusively as the agent of the shipper or owner, and as such, along with the Adams Express Company, shall not be, in any event responsible for the negligence of them performance of any agent, or any person; and the shipper and owner hereby severally agree that all the stipulations and conditions in this receipt contained, shall extend to and apply to the benefit of each and every Company or person to whom the Adams

Express Company may entrust or deliver the above described property for transportation, and shall define and limit the liability therefor of such other Company or person.

In no event shall the Adams Express Company be liable for any loss or damage unless the claim therefor shall be presented to them, in writing, at this office, within thirty days after this date, in a statement to which this receipt shall be annexed.

All articles of GLASS, or contained in glass, or any of a fragile nature, will be taken at Shipper's risk only, and the Shipper agrees that the Company shall not be held responsible for any injury, by breakage or otherwise, nor for damage to goods not properly packed and secured for transportation.

It is further agreed that said Company shall not, in any event, be liable for any loss, damage or detention, caused by the acts of God, Civil or Military authority, or by Rebellion, Piracy, Insurrection, or Riot, or the dangers incident to a time of war, or by any riotous or armed assemblage.

If any sum of money, besides the charge for transportation, is to be collected from the consignee on delivery of the above described property, and the same is not paid within thirty days from the date hereof, the Shipper agrees that this Company may return said property to him at the expiration of that time, subject to the conditions of this receipt, and that he will pay the charges for transportation both ways, and that the liability of this Company for such property while in its possession for the purpose of making such collection, shall be that of Warehouseman only.

For the Company,

*Ames*



Executed in duplicate

THE AMERICAN PRINTING PRESS COMPANY

D

N. S. Eric Comb  
Southern Dist. of N.Y.  
American Graphophone Co.  
Living & L. Arts  
Exhibit D.

19, 258 Broadway  
Room 207, Second National Bank Building

New York, June 30 1893  
Washington, D. C.

Edwin Leggett, Notary Public N.Y. Co.

This memorandum of agreement entered into this thirtieth day of June, 1893, between J. C. English, party of the first part, and James O. Clephane, party of the second part, Witnesses, that in view of the party of the second part, bringing together the representative of the American Graphophone Company, and the party of the first part, and also agreeing to use his influence with the officers of the said Graphophone Company, to further certain projects of the party of the first part in connection with the Graphophone enterprise, the party of the first part agrees in the event of an arrangement being made between the said Graphophone Company, and the party of the first part to furnish material for making cylinders, or the formula for the same, to pay to the party of the second part, one fourth of all moneys in the shape of cash, or royalties, as such may be received.



by the party of the first part. This agreement  
to apply if said party of the first part shall have  
some other party substituted in his place in the original  
agreement with the Am. Craft Co

(Seal)  
The party of the first part  
Jas O Clephane (Seal)  
party of the second part

Witness my hand and seal this 22nd day of April 1890.  
Jas O Clephane  
J. T. McLaughlin



OFFICE OF

THE AMERICAN PRINTING PRESS COMPANY

ROOM 26, SECOND NATIONAL BANK BUILDING

E

N. S. Circuit Court  
Southern Dist. of N.Y.  
American Graphophone Co.  
agent.

Living H. Leeds et al.

Exhibit C

Washington, D. C. Recd. June 30 1893

Edmund Segal

Notary Public N.Y.C.

Dear Mr. English:

Mr. MacDonald writes me  
as follows:

"The last batch of cylinders seems  
to be all that is necessary. They are  
so much like the Edison that I cannot  
tell them apart when I once mix them  
up."

This looks well. I will probably  
not get to Bridgeport this week, as my  
party writes he will not be able to  
be here this week.

I leave for Wash. on Sunday  
night & be gone two or three days,

Truly

J. O. Clephane

Please sign the enclosed in duplicate,  
and return ~~one~~ me one.



W. S. P. H. M. & Co. & Co.

Budapest Conn.  
Aug 27, 96

Mr J. C. English  
#838 8th Ave. N.Y.

My dear Sir:

Some time ago I wrote you two letters, which, I am now, satisfied, did you gross injustice.

I am exceedingly sorry that momentary difficulties and disappointments, and untrustworthy information should have led me to address you as I did.

I therefore desire to withdraw them, and frankly assure you that I am sorry they were written.

Very truly

W. S. P. H. M. & Co. & Co.



Q17. You have stated, I believe that acetate of aluminum is not always used. What in a general way is substituted for it, if you know, that is, is it another mineral or another compound of aluminum, or something not a mineral?

A. In the manufacture of soap blanks, or as we more safely term it, stearate blanks, because the word soap is misleading while the term stearate applies to something hard in all cylinder references, stearic acid and metallic oxide, are united in proper chemical proportions to produce a stearate. Caustic soda is a sodium oxide and the aluminum which is added must necessarily enter in the composition also as an oxide. When prepared with acetate of aluminum, the acetate of aluminum does not enter into the preparation as a mechanical mixture of acetate of aluminum with the stearic acid, but undergoes a decomposition, the acetic acid being liberated, and the aluminum oxide uniting with the stearic acid to produce a stearate of aluminum. So that the Edison blank and the graphophone blank is most likely a double stearate of soda and aluminum. Without changing the appearance of the cylinder or the results obtained, other metallic oxides might be substituted for the aluminum.



I have made cylinder material substituting magnesia oxide instead of the aluminum oxide, with results equally satisfactory, without changing the general appearance.

Q18 Is it a fact that the alumina or the magnesia might be introduced in other forms than that of an acetate?

A: It is not necessary that the oxide should be introduced as an acetate.

Q19. Have you at hand and can you produce, any specimens of various materials, such as you have mentioned as having been used in the manufacture of blanks for phonographs?

A. I have and now produce the same. The first which I have marked "Exhibit G", is a sample of stearic acid used in the manufacture of stearic blanks. The word "stearine" and "stearic acid" has been used indiscriminately in phonograph references, but in all cases stearic acid is used in the manufacture of blanks. Stearine is an intermediate product between tallow and stearic acid, and in the manufacture of blanks, even if stearine were used it would as a part of the process be reduced to stearic acid before the stearate forms, the action of caustic soda upon fats or stearines, is to reduce them to an acid body.



Exhibit H is a sample of blank material ready for molding into a phonograph ~~wax~~ blank, made by me from the best materials obtainable. Its color is light owing to having been made in anagate kettle. When made from the purest materials, the color is always lighter than when made from less pure material, even though it is made in an iron kettle which has a tendency to darken the compound. This sample, it will be observed is very hard and brittle, and yet soaplike to the touch. If placed in cold water it will remain for a very long time without disintegrating, but hot water very quickly softens it. It will be observed that the sample of cylinder material is not waxlike in its character, it does not soften between the fingers. ~~nor can, by any pressure that can ordinarily be brought to bear upon it, be used for inscriptions.~~

This also applies to the stearic acid.

Exhibit I, is a sample of pure beeswax, a substance known to the ancients and extensively used by them at one time for writing upon with a stylus as they could rub out records thus made and re-write upon the new surface formed.

Worcester's Dictionary describes beeswax as a thick tenacious substance forming the cells of bees, and all substances which have been described as waxlike, and



which were waxlike, have had the character in a general way, of beeswax.

Exhibit J, is a sample of paraffine frequently called paraffine wax because it has many of the characteristics of beeswax. At one time being used for making chewing gum, owing to this waxlike nature.

Exhibit K, is a sample of black or crude ozokerite, which is practically a fossil paraffine. This is to be found in the market in a purified state, yellow in color like beeswax and sold by grocers as yellow wax, and it is also still further purified and ~~waxed~~ bleached and molded and pressed into cakes and sold by the grocermen and many druggists as whitewax. These ozokerites in their respective colors, resemble ~~waxed~~ beeswax of similar color so closely that the uninitiated would not distinguish them.

Exhibit L, is a sample of what is sold as Carnauba wax. It will be observed that this is not waxlike, but crude Carnauba wax is produced in nature ~~as in~~ usually as a mixture of about three parts of very hard resin and one part of Carnauba wax. In the arts this Carnauba resin is separated from the wax and used in the manufacture of a fine quality of artists varnish. The residual product is a waxlike material; if absolutely freed from all the resin. The word "wax" as applied to articles of commerce



does not always signify that the preparation is made of wax nor that it is waxlike; the word "wax" has been applied to substances of almost every description found in nature. Sealing wax was originally made of wax, but at the present time wax does not enter into the composition of the better grades of sealing wax, it is a mixture of shellac and some resinous matter like balsam of fir, Venice turpentine, or other similar substances, but owing to the early history of sealing wax, it has continued to bear the name of a wax.

Carnauba wax is a vegetable product and more strictly speaking, is the palm wax mentioned in encyclopedias and other works of reference. There are other vegetable waxes, Chinese wax, for instance, I believe called by the Chinese "Te La" / This is deposited by an insect of the cochineal species upon the twigs of trees and these twigs are gathered by the Chinese and when boiled in water the wax separates and floats. This is waxlike and in general appearance resembles spermaceti. Spermaceti is also another form of wax, which has all the general characters of wax or waxlike substances.

Q20. Is the stearic acid crystalline or ~~amorphous~~ <sup>structure</sup> in its ~~substance~~.

A. pure stearic acid is a crystalline substance.



There are stearic acids in the market, which owing to the method of manufacture, have a general appearance which to the uninitiated might not look like a crystalline body, but it is nevertheless a crystalline substance. All crystalline structures are not visible to the naked eye, some are so fine that it requires the aid of a microscope to determine it.

In the manufacture of blank material, the purest form of stearic acid produces the best results, and as the cylinder material is not a mechanical mixture, but a definite chemical compound different in appearance from the elements that are combined to produce it. If the stearic acid has not been properly purified and a little oleic acid remains, the cylinder material is apt to be spoiled, or if as is the case with some stearies, there remains too much palmetic acid, the result is a red cylinder, which does not materially interfere with the quality. A little glycerine remaining in the stearic acid also produces very bad results.

Q21. To your knowledge, were sound records made in the earlier history of this art of Commercial or impure Carnauba wax like the specimen you have marked "Exhibit I"?

A. The first blanks made by Mr. Edison for his modern machine contained a small percentage of Carnauba



wax in combination with a larger quantity of white wax .

Q22. What was the purpose of introducing the Carnauba wax?

A. Undoubtedly introduced to harden the compound, this resulting hardness came from the resin which the Carnauba contained and not from the Carnauba wax itself, which was no harder than the whitewax.

Q23. If a large quantity of the commercially impure Carnauba wax had been used in the cylinder composition, ~~would~~ might the resulting composition, in your opinion as a expert, be approximately as hard as the modern record, and if so, to what would this hardness be due?

A. It is very easy to make a hard record by using a large percentage of Carnauba wax, but this record made upon the lines as followed by Mr. Edison and Bell & Tainter, would have made a cylinder sticky and resinous in its character and producing the result which caused Mr. Edison to abandon his whitewax cylinder. A cylinder syicky in its character causes the recorder knife to drag and in consequence produces records inferior to the records produced upon the stearate cylinder. The hardness of any record made from Carnauba wax is due to the resin contained in the Carnauba wax and not to the wax itself and a cylinder of this description would not be a wax cylinder but a resinous cylinder and could be as readily made from any



other hard resin with the addition of a small quantity of some wax or waxlike material.

Q24. Please state, in view of the characteristics of various materials which you have discussed, whether the modern stearate or soap record, is in any sense a waxlike material, in your opinion? stating your reasons.

A. The modern cylinder material is neither wax nor waxlike in its nature. In the search for a material for the phonograph blank, it was the object of Mr. Edison who produced the only satisfactory results, to get a material which was not waxlike. The reason for avoiding waxlike substances was that they were not hard enough to withstand repeated ~~reproduction~~ rubbing of the reproducing style, and consequently valueless for the modern purpose to which nearly all blanks are put, that is, the making of musical records.

Adjourned to meet at the same place Saturday,  
October 1, 1898, at 10 A.M.



New York Oct. 1, 1898.

Met pursuant to adjournment.

Present Counsel as before.

Witness continues answer to last question.

A. Wax or waxlike substances, owing to their low melting point, are objectionable as a cylinder material as they are unsuitable for use in hot climates. This does not apply to the Edison material, and in confirmation of statements that I have made in regard to wax or waxlike material, Worcester's Dictionary says, "Wax: A thick, tenacious substance forming the cells of bees" 2nd. A thick, tenacious vegetable product; 3rd. any thick tenacious substance resembling wax." "Waxy: Resembling wax, soft, yielding, or tenacious like wax." Encyclopedic Dictionary, "Wax: Botanically, any substance more or less resembling beeswax. Chemically, a term originally restricted to beeswax, but now extended to various bodies possessing similar characters. Beeswax, Chinese wax, mineral wax, spermaceti." Johnson's Dictionary, "Wax: Resembling wax especially in respect to its softness and readiness in yielding." Century Dictionary: "Waxy: Resembling wax, soft as wax. " Easily effaced, as if written



in wax. "Shakespeare, Henry V." Imperial Dictionary,  
"Sealing Wax: Common beeswax was first used in this country,  
and in Europe generally, being mixed with earthy materials  
to give it consistency." Encyclopedia Britannica: (American-  
ized) "In Medieval times sealing wax was a mixture of  
Venice turpentine, beeswax, and coloring matter. The prop-  
eration now employed contains no wax." Encyclopedic  
Dictionary: "Palm wax contains according to Vauquelin,  
one third wax and two thirds resin."

Palm wax is the wax sold in commerce under the  
general name of Carnauba wax, although quoted in some  
price lists under its correct term of palm wax.

Q25. Did the difference in the natures of the  
blanks  
wax ~~record~~ of the Complainant Company and the stearate  
blanks  
~~records~~ of the Edison works, as stated by you, necessitate  
any difference in the shapes of the recording tools on  
the machines put out by the respective companies?

A. The Graphophone Company changed their recorder  
points  
and reproducer ~~forms~~ to correspond with those used upon the  
phonograph when they adopted the stearate blanks.  
Upon the original graphophones of the North American  
Phonograph Company, fine needle-like points were used, while  
upon the phonograph a recording tool known as the cup  
recorder was used. This cup recorder making a groove



semicircular groove. The narrow groove ~~is~~ made by the Graphophone recorder points necessitated a correspondingly narrow reproducer point, while the circular groove made by the Edison tool, allowed the use of a ball pointed reproducing stylus. The broad tool used upon the phonograph would not successfully work upon a wax or waxlike material owing to the sticky character of such material as it would cause the needle to drag and not ~~reproduce~~ record perfectly, and for that reason could not be used upon the material of the Graphophone patent, and the recording tool as made and used upon the Graphophones as first made, and the general construction of the diaphragm and its mountings, would not operate successfully in making a record upon the stearate blank. The construction of the mechanism as used upon the Graphophone recorder, was such that it would have had a tendency to break the record, and not cut a clean groove, as is done when the Edison mechanism is used. The Edison mechanism if used upon the Graphophone waxlike material, would have a tendency to stick and produce imperfect results.

Examination of the same.



CROSS EXAMINATION BY MR. EDMONDS:

XQ23. Right having been reserved by consent, Defendants' Counsel now enters timely objection to the whole of the foregoing ~~cross~~ direct examination on the ground that it is wholly immaterial and irrelevant. Without waiving this objection he proceeds to cross examine.

XQ25. Are you acquainted with the method of preparing or manufacturing the stearine supplied for use in the construction of talking machine blanks?

A. I know various methods by which it is prepared.

XQ27. I am asking you for your personal knowledge as to the method or methods observed by manufacturers to furnish this material.

A. I am familiar with the various methods used in the manufacture of stearic acid, because it is stearic acid that is generally used and not stearine.

XQ28. That is to say, the thing supplied to the talking machines companies is stearic acid?

A. Yes sir.

XQ29. Have you ever observed the method or methods actually employed in the manufacture of this stearic acid?



A. I have never been permitted to enter a stearic acid factory as each manufacturer is supposed to have more or less a method of his own of making stearic acid, and those using the sulphuric acid process are not particularly anxious to let it be ~~known~~ known. It produces a larger output than the ~~clean~~ <sup>steam</sup> process but of not so good a quality.

XQ30. What was the formula which you claim to have furnished to Mr. Macdonald in the fall of 1894?

A. A compound of stearic acid, acetate of alumina, caustic soda, and white ozokerite, properly chemically combined and in suitable proportions.

XQ31. Did you thereafter discontinue experimenting with blank compositions?

A. ~~I did not~~ I have made many hundred experiments since that time.

XQ32. Have you since that time made any analyses quantitative or otherwise, of blanks made by other persons or concerns?

A. I have made no analyses in the strict sense of the word, but I am so familiar with the general character of compounds of this class, that I can I think, ~~distinguish changes which may be very radical, and which~~



distinguish if it were a stearic compound or not.

XQ33. How long were you employed by Eimer & Amend?

A. I first entered their employ in 1877 and finally left their employ in 1887.

XQ34. What was your business prior to 1877?

A. A pharmacist, or as is more generally known, a retail druggist, but the most of my experience during that time and during my first year with Eimer & Amend was laboratory work.

XQ35. Do you know what mono-stearine is? And can you describe the chemical actions and reactions incident to its production?

A. My experience in chemical work has been of strictly a practical nature, and could not conveniently answer this question without reference to theoretical works.

XQ36. Do you mean that you could answer the question if permitted first to exhaust the information of the literature on the subject?

A. I mean that practical experience in the manufacturing does not necessarily require a theoretical experience, because the duties of the analytical chemist are different from those of the practical worker.



XQ37. I have not asked you for theories but for facts. Can you or can you not define mono-stearine and state the chemical action and reaction incident to its production. Please answer categorically.

A. Not without chemical reference.

XQ38. I presume you have some idea of the qualities or characteristics which should be present in the best known talking machine blank material of today, have you not?

A. I think I have.

XQ39. Is it your belief that such a material should be cohesive?

A. The most desirable quality in a blank is extreme dryness. If cohesive is used in the sense that the body should be a solid compact one, it is desirable.

XQ40. In what other sense is the word cohesive commonly used?

A. I think I have known it to be used as applied to materials that were plastic in their nature.

XQ41. Would you call such a body as the material of the so-called stearate blanks, a solid compact body?

A. I do.

XQ42. Would in your opinion this body be correctly described as cohesive?



A. I do not think that a definite chemical salt which in its purest form is a crystalline body, should be termed cohesive.

XQ43. So that you express it as your belief and opinion that the stearate blank, concerning which you have heretofore testified, is not a cohesive material?

A. I do not think that it is a cohesive material in the sense that it has been used in connection with the waxlike material of the graphophone patent.

XQ44. I do not care, at the present time at least, for your expert opinion as to the interpretation of the graphophone patent. Having this in mind, will you not define the word "cohesive", giving it its well known and commonly understood meaning, if you can.

A. My own opinion is that like the graphophone patent, its meaning has not been <sup>judicially</sup> ~~sufficiently~~ passed upon.

XQ45. Question repeated.

Question objected to as in the form put, which eliminates the meaning of the term as employed in the patent in suit, as being utterly immaterial and irrelevant, and further as having been already answered.



And further, as incompetent, witness not having qualified as an expert on the question of the common and well known meaning of words.

A. To the best of my knowledge, information and belief, my previous answer covers the point.

XQ46. And you can make no better answer?

A. Not at the moment.

XQ47. How long a time do you think it would take you to prepare yourself to define the word "cohesive"?

Objected to as immaterial.

A. There are some authorities whose opinions I might ~~have~~ quote, but as dictionaries do not always agree, I cannot say that I can offer further information that I might derive from Webster or Worcester upon the subject.

XQ48. What authorities if any, did you consult to enable you to testify that you "think" that a definite salt chemical ~~form~~ under certain conditions, is not cohesive?

A. Same objection.

A. No authorities were consulted.

XQ49.

EXAMINATION CLOSED.

*John C. Taylor*



U. S. Circuit Court  
District of New Jersey

American Graphophone  
Company

vs.

United States Phonograph  
Company

Petition &

Hayes & Lambert  
et al.

Law Offices.  
Hayes & Lambert.  
Newark N.J.

ROOM 901, PRUDENTIAL BLDG.  
765 BROAD STREET.



To the Commissioner of Patents:

The petition of the United States Phonograph Company, a corporation established under the laws of the State of New Jersey, having its principal office in the City of Newark, in said State, respectfully shows;

First. That on the fourth day of May 1886, patent number 341,214 issued to C. A. Bell and S. Tainter for improvements in recording and reproducing speech and other sounds.

Second. That your petitioner is informed and believes that on the 26th day of March, 1877, Thomas A. Edison, filed in the United States Patent Office an application for patent for improvements in phonographs bearing case number 128.

Third. That your petitioner verily believes that said application has not been prosecuted during the past two years and upwards; and he also verily believes that the last action had therein was on or about the year 1888.

Fourth. That said application has therefore become and now stands abandoned.

Fifth. That on or about the 17th day of December, 1897, the Assignee of said Patentees the American Graphophone Company began suit in the Circuit Court of the United States for the District of New Jersey against your petitioner which suit is based upon said patent and the same is now pending and undetermined.

Sixth. Your petitioner is informed and believes that to enable ~~him~~<sup>it</sup> to prepare and conduct ~~his~~<sup>its</sup> defense in such suit it is material and necessary that ~~he~~<sup>it</sup> be allowed access to and copies of the files of such abandoned case.

*its office* Seventh. Your petitioner therefore requests that ~~he~~ or ~~his~~ attorney, be permitted to inspect and be furnished copies of all or any portion of such files.

*United States Phonograph Co.*  
Petitioner.

*By Alfred Clark, Secretary*



State of New Jersey, County of Essex SS.

On this <sup>22</sup> day of December, 1898, before me, a notary public in and for said County and State personally appeared Alfred Clark, secretary and general manager of the United States Phonograph Company, the above named petitioner, who being by me duly sworn deposes and says that he has read the foregoing petition and knows its contents, and that the same is true, except as to the matter therein stated on information or belief, and as to those matters he believes it to be true.

*F. B. Stewart* . . . . .

Notary Public.



UNITED STATES CIRCUIT COURT,

DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONES COMPANY,

-VS-

UNITED STATES PHONOGRAPH COMPANY.

:

:

:

:

:

IN EQUITY.

Patents No's 341,314

and 341,268.

It is ordered that the time for the defendant,  
United States Phonograph Company, to put in testimony in  
defence, be extended to the first day of January next, and  
be limited to that time.



UNITED STATES DISTRICT COURT,  
DISTRICT OF NEW YORK.

THE UNIVERSITY OF CHICAGO

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THE UNIVERSITY OF CHICAGO

21, 22.

100



UNITED STATES CIRCUIT COURT,  
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE COMPANY,	:	In Equity.
vs.	:	On Patents 341,214
UNITED STATES PHONOGRAPH COMPANY, ET AL.	:	and 342,288.

AMERICAN GRAPHOPHONE COMPANY,	:	In Equity.
vs.	:	On Patent 341,287.
UNITED STATES PHONOGRAPH COMPANY, ET AL.	:	

On reading and filing the affidavits of Edward D. Easton and Philip Mauro verified January 20, 1899, and after due consideration thereof, it is, on motion of counsel for complainant,

ORDERED that the defendants, United States Phonograph Company et al, show cause, if any they have, before this Court, at the United States Court Rooms, Post Office Building, Newark, N. J., on the 28th day of January 1899, at ten o'clock A. M., why an order should not be entered by this Court commanding the defendants, and each of them, to deliver up to the judicial custody to abide the result of the cause, all apparatus for making duplicate sound records, and all duplicate sound records, in the possession or under the control of said defendants or any of them, or in the alternative enjoining and restraining the said defendants and each of them, and their associates, attorneys, servants, clerks, agents and workmen, against selling, leasing, encumbering, or in anywise parting, either in whole or in part, with the title to and possession of all duplicate sound records and all apparatus for making duplicate



sound records now owned, either in whole or in part, by said defendants, or any of them, or in their possession or under their control, or in the possession or under the control of any of them.

IT IS FURTHER ORDERED that, until the hearing and determination of this order to show cause, the said defendants and each of them, and their associates, attorneys, servants, clerks, agents and workmen, be and they hereby are enjoined and restrained from selling, leasing, encumbering, removing from their present location, or in anywise parting, with the title to and possession of any duplicate sound records in bulk or in any manner otherwise than as heretofore observed by them in the course of trade and of any apparatus for making duplicate sound records now owned, either in whole or in part, by said defendants or any of them, or in their possession or under their control, or in the possession or under the control of any of them.

IT IS FURTHER ORDERED that a copy of this order and of the affidavits upon which the same is made, be served upon the defendants or upon their solicitors on or before January 25th 1899.

Andrew Kirkpatrick,

United States District Judge.

Newark, January 23, 1899.



U. S. CIRCUIT COURT, DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE CO.,  
vs.  
U. S. PHONOGRAPH CO.

IN EQUITY  
Suit on patent No.341,214

STATE OF NEW YORK, :  
County of New York. : SS.:

E. D. EASTON, being duly sworn deposes and says:  
I reside in Arcola, New Jersey, and am President of the complainant Company. On the 18th day of January 1899, I was informed by Leon F. Douglass of Chicago that the defendant, the U. S. Phonograph Co. was negotiating for the sale to him of all its record-making machinery, sound-records, etc., and that after personal investigation he had declined to make the purchase. He also informed me that defendant was negotiating with one T. E. Challenger of Philadelphia for the sale of said articles. From other sources I have learned that defendants, while protracting this suit, were making strenuous efforts to sell their property and assets, so that the end of the litigation might find them without any means to satisfy a judgment.

Immediately on receipt of this information from Mr. Douglass I instructed Mr. P. V. DeGraw of Philadelphia, to call upon Mr. Challenger and ascertain the facts regarding the proposed sale. I am to-day in receipt of a report from Mr. DeGraw stating that he saw Mr. Challenger who informed him that the report regarding his intended purchase of the defendants' Record-Making Plant was correct.



The proposed sale and delivery of the infringing machines and sound-records, if permitted will work great and irreparable injury to complainant. It will render futile the suit which complainant has been prosecuting with great diligence; if the infringing machines and records pass out of the jurisdiction of the Court complainant will be put to the expense of pursuing them and beginning the same proceedings elsewhere; it will be deprived of the relief to which, if it prevails in this suit, it will be entitled namely that the infringing devices be delivered up to the custody of the Court; and finally defendant will, by parting with its property, escape all responsibility.

E. D. Easton.

Sworn to and subscribed, before me  
this 20th day of January, 1899.

Elisha K. Camp,

Notary Public,

Notarial  
seal)

N. Y. Co.,



U. S. CIRCUIT COURT,  
DISTRICT OF NEW JERSEY.

AMERICAN GRAPHOPHONE CO.

vs.

U. S. PHONOGRAPH CO. et al.

In Equity.

STATE AND COUNTY OF NEW YORK. ss:

PHILIP MAURO being duly sworn says:

I reside in Washington, D. C. and am of counsel for complainant herein. This suit has been diligently pressed by complainant in the desire to bring it to final hearing at the earliest day. defendants, on the other hand, have sought and obtained several enlargements of its time for taking testimony, which is still uncompleted. Complainant's counsel have several times applied to the Court for orders limiting defendant's time. The last order limited their time to expire December 31, 1898. Defendants did not begin taking their expert testimony until December 21, 1898. On that day Mr. Vansize began his direct testimony, continuing with great prolixity, putting in the prior patents and literature used in previous cases, until December 30th, 1898. He is now awaiting the convenience of counsel for cross-examination. The expert deposition in the second case has not yet been begun.

The course pursued by defendants will necessitate a great deal of testimony in reply by complainant, and will result, in my opinion, in a record of at least a thousand pages. It will therefore be physically impossible for this



case to be brought to final hearing for many months to come.

Philip Mauro,

Sworn and subscribed to before me  
this 20th day of January, 1899.

Elisha K. Camp,

Notary Public,

(Notarial  
Seal)

N. Y. Co.



UNITED STATES DISTRICT COURT.  
 DISTRICT OF NEW JERSEY.

Amalgamated Graphophone Co.

-VS-

United States Phonograph  
 Company of N. J.

Defendants.

On petitions No. 241, 242 and  
 241, 238.

Amalgamated Graphophone Co.

-VS-

United States Phonograph  
 Company of N. J.

Plaintiffs.

On petition No. 241, 237.

HAYES & TROTTER,

Solicitors.



IN THE CIRCUIT COURT OF THE UNITED STATES  
FOR THE DISTRICT OF NEW JERSEY  
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AMERICAN GRAPHOPHONE COMPANY	:	
vs.	:	IN EQUITY
UNITED STATES PHONOGRAPH COMPANY AND	:	(On Patents Nos.
GEORGE E. TENKSBURY	:	341,214 & 341,288)

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TESTIMONY ON BEHALF OF DEFENDANT UNITED STATES PHONOGRAPH COMPANY, taken this Nineteenth day of June, A. D. 1899 at eleven o'clock in the forenoon, at the Office of Hayes & Lambert, 765 Broad Street, Newark, pursuant to notice.

Appearances

On behalf of the defendant United States Phonograph Company, Howard W. Hayes. Esquire.

On behalf of the complainant C. L. Massie Esquire

Dr. J. Henry Clark a witness produced on behalf of the defendant, being duly sworn deposes and says:

Q.1. Please state your name, age and occupation?

A A. J. Henry Clark, forty five, Physician.

Q. 2 Are you the Police Surgeon for the City of Newark?

A. I am.

Q. 3 Did you in your official capacity as Police Surgeon ex-



Q. 3. Did you in your official capacity as Police Surgeon examine George E. Tewksbury, one of the defendants in the above case, as to his mental capacity; and if so, when did you examine him and what did you find his condition?

A. I did examine him some time last winter. I found him mentally incapable of properly caring for his own interests, incapable to transact ordinary business.

Q 4. In your opinion when you examined him was he capable mentally of giving testimony in a law suit involving complicated business transactions and negotiations, in which transactions and negotiations he had taken part a year or more previously?

A. No.

Q 5. What is the medical term for the mental trouble with which he was suffering?

A. Paresis.

Q.6 In your opinion will his condition ever be better mentally than it was when you examined him?

A. No; he is liable to grow worse, but will never be any better.

Q. 7 Did you give a certificate as to his condition upon which proceedings for his commitment as a lunatic were to be based?

A. Yes.

Q. 8 Did any other physician examine him at the same time, if so who, and did or did not his conclusion as to the case agree with yours?



A. Yes, Dr. Walter S. Washington and his conclusins regarding the case agreed with mine.

*J. Henry Clark, M. D.*

Frank L. Capps a witness produced on behalf of the defendant, being duly sworn deposes and says:

Q. 1 State your name, age and occupation and r sidence?

A. Name Frank L. Capps, age thirty years, machinist, residence Newark.

Q 2. I show you exhibit "Defendant's exhibit Vansize Model of Duplicating Apparatus, Edison's British Patent of 1878, S. . O. Ex, May 31, 1899". Did you make that model?

A. Yes.

Q. 3 Who made the two tin foil records on it?

A. They we re made under my direction.

Q. 4 Did you personally superintend the construction?

A. Yes.

Q. 5 One of the records contains an original record and the other is a duplicate, upon what sort of a machine was the original record made?

A. The original record was made on an ordinary phonograph, with a rigid diaphragm the same as was used on the old tin foil phonograph.



Q. 6 What was the subject of that record as near as you can remember?

A. Well I am not positive about it, I think we recited "Mary had a little lamb", and we sounded each of the vowels, a, e, i, o, u, following the recitation.

Q. 7 Did you hear this original record reproduced and if so upon what instruments?

A. Yes, we reproduced it on an ordinary phonograph.

Q. 8. Did you see the duplicate record on the model made?

A. Yes.

Q. 9 On what machine was the duplicate made?

A. The duplicate was made on the model which <sup>you</sup> ~~we~~ have here, which I built.

Q. 10 Did you hear this duplicate reproduced and if so on what machine?

A. Yes, we reproduced the duplicate on the ordinary phonograph.

Q. 11 Did the duplicate reproduce the sounds which ~~were~~ made by the original when a reproduction was made upon it on the phonograph?

A. Yes.

Q. 12 In reference to their respective nearness to the back rod of the model which of the two cylinders is the original and which the duplicate?



A. The cylinder nearest the back rod is the original and the farther one is the duplicate.

Q. 13 I show you two cylinders and ask you who made them, of what they are composed and what they are?

A. These cylinders were made by me, they are composed of bees wax and paraffine, I don't remember the selections on these, they are made so long ago.

Q 14 Is one of them an original record and one a duplicate?

A Yes. The longer one is an original one, the other one a duplicate.

Q. 15 Is there ~~any~~ a record on the original one?

A. Yes.

Q. 16 How was that record put on the original?

A. The record was put on the original by means of a stylus attached directly to the diaphragm the same as in the early phonographs.

Q. 17. Was the record then made on a phonograph?

A. Yes.

Q 17. Did you hear the record made on the original reproduced, and if so on what instrument?

A Yes, we reproduced it on a phonograph. I reproduced it on a phonograph.

Q. 18 Is there a record on the duplicate?

A. Yes.

Q. 19 How and by whom was the record put on the duplicate?



A. The record was put on the duplicate with this duplicating machine you have here, under my direction.

Q. 20 Did you hear the record on the duplicate reproduced, and if so upon what instrument?

A. Yes, I reproduced it on the phonograph.

Q. 21 When the duplicate was <sup>reproduced</sup> ~~duplicated~~ on the phonograph did it give the same sounds that were given by the original when it was reproduced on the phonograph?

A. Yes, it reproduced the same sounds.

Q. 22 How long ago was these two records made?

A. These two records were made in December 1898.

Q. 23 What is the proportion of bees wax and paraffine used in their composition?

A. Now, as to that, we followed the formula used in a patent.

Q 24. What patent.

A. ~~NR~~ No 341,214.

Q. 25 In making this duplicate on the model shown you did you use the ~~xykix~~ mandrels now on that model?

A. yes.

Q 25 Were those mandrels changed in any way to enable the tin foil duplicates to be made?

A. We fitted on the shell you see there, but adapted it for the tin foil, the outside of the shell has a screw thread, the same as all tin foil machines.

Q 26. I show you two soap cylinders, and ask you if there are



records on them and whether one is an original and the other a duplicate; and if so, which is the original, and which the duplicate?

A. This dark colored cylinder is an original record and the light one is the duplicate made from it.

Q. 27 By whom and on what machine was the original record made?

A. The original record was made by me on a phonograph.

Q. 28. Have you heard that original reproduced on a phonograph, and if so, what is the selection?

A. Yes, I have <sup>heard it</sup> reproduced, the selection is "Casey's at the bat".

Q. 29 How was the duplicate record made?

A. The duplicate was made from this original on the duplicating machine we have here, using the same styluses that were used for making the tin foil record and soft wax record.

Q. 30. Have you heard the record on this soap duplicate reproduced, and if so on what instrument?

A. Yes, I have reproduced it on a phonograph.

Q. 31. What is the selection on it?

A. The selection is "Casey's at the bat".

Q. 32/ Is it the same selection that is on the original?

A. Yes, it is the same.

CROSS

Counsel for defendant offers in evidence original tin foil record on Vansize Model and it is marked "Defendant's Exhibit Orig-



iginal tin foil record, June 19, 1899 S. D. O. Ex."

Defendant also offers in evidence duplicate tin foil record on model and it is marked "Defendant's Exhibit Duplicate Tin Foil Record June 19, 1899 S. D. O. Ex."

Defendant offers in evidence original paraffine and wax record and it is marked "Defendant's Exhibit Original Paraffine and Wax Record, June 19, 1899 S. D. O. Ex."

Defendant offers in evidence Duplicate Paraffine and Wax record and it is marked "Defendant's Exhibit Duplicate Paraffine and Wax record, June 19, 1899 S. D. O. Ex."

Defendant offers in evidence Original Soap Record and it is marked "Defendant's Exhibit Original Soap Record, June 19, 1899 S. D. O. Ex."

Defendant offers in evidence duplicate Soap Record and it is marked "Defendant's Exhibit Duplicate Record, June 19, 1899 S. D. O. Ex."

Defendant offers in evidence certified copy of order of Essex County Pleas Court committing George E. Towksbury as a lunatic.

~~Defendant offers in evidence~~ and it is marked "Defendant's Exhibit Common Pleas Commitment, June 19, 1899 S. D. O. Ex"

Defendant offers in evidence affidavit of George E. Towksbury made in the above cause for use on the motion for preliminary injunction, verified ~~made~~ May 25, 1898 and it is marked "Defendant's Exhibit Towksbury Affidavit, June 19, 1899 S. D. O. Ex."



Defendant offers in evidence additional affidavit of George E. Tewksbury used on the motion for preliminary injunction in the above cause, verified May 25, 1898 and it is marked "Defendant's Exhibit Tewksbury additional affidavit June 19, 1899 S. D. C. Ex."

CROSS EXAMINATION BY MR. MASSIE.

X Q 33. I understand that you are a practical machinist, please state whether or not you are also an inventor?

A. Yes, I am

X Q. 34 You have received several Patents for your inventions, have you not?

A Yes.

X Q. 35 Referring to your answer to Q. 5 do you mean that the original tin foil record was made on a modern style phonograph with the old style diaphragm the same as used on the old tin foil phonograph?

A. We used the modern phonograph as a frame work only and constructed a coarse threaded screw, a threaded cylinder for carrying tin foil and a diaphragm the same as used on all tin foil machines

X.Q. 36 By a coarse threaded screw you refer to the feed screw?

A. Yes.

X Q 37 By whose directions, or by what instructions, did you construct this composite phonograph?



A. Well, Mr. Vansize told me to construct a phonograph for making a tin foil record, and I used the frame work of a regular phonograph as best means to accomplish what he wanted..

X Q. 38 Then you contrived the machine yourself, I mean it was your design?

A. No, the machine wasn't my design, the machine had a frame work , a threaded screw carrying a mandrel and diaphragm for making the record, this is the same as all of the old tin foil phonographs

X Q.. 39 In constructing this machine, did you make use of any blue prints or sketches?

A. We had ~~no sketches or blue prints, or other instructions~~ except copies of the Patent which I was told to follow.

~~XX~~

A I had no drawings or blue prints, but constructed the machine from my knowledge of the old tin foil phonographs.

X Q. 40 How does the duplicate tin foil <sup>record</sup> ~~phonograph~~ put in evidence this morning, compare with the duplicate paraffine and wax record also introduced this morning in loudness and distinctness?

A. They are all nearly alike.

X Q. 41 Do you consider the duplicate paraffine and wax record a satisfactory record?

A. Yes.

X Q. 42 Please state the circumstances under which you constructed the duplicating machine, now before you?

A.

A. I was given a copy of an English Patent by Mr. Vansize, Patent No 1644. Mr. Vansize told me to construct a duplicating machine following the drawings shown in that Patent, the drawings are Figs. 14 & 15 on sheet 2, giving the general form of the machine and Fig. 59 on Sheet 4, showing the method of arranging the bar in relation to the two cylinders.

X Q. 43 Did you introduce any alterations?

A. We had some difficulty in getting a governor of the kind shown and we used regular gearing to turn the governor instead of the spiral gearing. There were no other alterations made.

X Q. 44 Do the two mandrels in the model before you revolve at the same speed?

A. Yes.

X Q. 45 What sort of phonograph was employed in obtaining reproductions of the original and duplicate records put in evidence this morning?

A. We used the same phonograph with which we made the original records.

X Q. 46 Did you use the same diaphragm and stylus?

A. Yes, <sup>we used</sup> the same stylus, except in making the original soap record we used a sharp stylus.

X Q. 47 I understand that in making the tin foil master record as in making the wax and paraffine master record a compara-



tively sharp stylus was used, and the same stylus employed in reproducing from these records; and in making the soap record the same stylus was used, but a comparatively blunt stylus was employed for reproducing. Is this correct?

A. We used a blunt point for making and reproducing all of the records except the soap record. For making the soap record we used a sharp point, but reproduced it with a blunt point.

X Q. 48 Did you not make the duplicating machines used by the defendant company?

A. Yes.

X Q. 49 Please state what effect if any, would be produced if the outer mandrel of the Vansize model before you were revolved at a higher rate of speed than the mandrel for the master?

A. The sound waves would be stretched out or made longer.

X Q. 50 Would the reproduction obtained from such a duplicate be the same as a reproduction obtained from a duplicate made when both mandrels revolved at the same speed?

A. ~~It would be louder.~~ It might be louder.

X Q. 51 Would both these duplicates be accurate reproductions of the original record; and if not which would be the more accurate?

A. There would be no difference, except for a slight difference of the loudness in the records.

X Q. 52 Is each duplicate record before you as loud or as distinct as the master that produced it?

A. They are not.

X Q. 53 In the duplicates before you as deep as the corresponding indentations in their respective masters?

A. Well, I don't think they are quite as deep as their masters.

X Q. 54 Would you have been able to recognize the record on the duplicate tin foil when it was put on the phonograph for reproduction, if you had not known what the record was beforehand?

A. Yes.

*Frank L. Caff*

Defendant's Evidence in defence closed, except that defendants counsel reserves leave to put it in evidence any time before complainant's testimony in rebuttal begins, any papers or articles referred to and used in the testimony and omitted to be formally offered in evidence if it shall appear that any such exists.



IN THE CIRCUIT COURT OF THE UNITED STATES,  
District of New Jersey.

-----X  
American Graphophone Company.

-vs.-

U. S. Phonograph Co., et al.  
-----X

In Equity on Patents  
No. 341,214, and  
No. 341,288.

S T I P U L A T I O N .

It is hereby stipulated by and between counsel for the American Graphophone Co., and the U. S. Phonograph Co., respectively, that the direct depositions of C. S. Tainter and Thomas H. Macdonald, taken in the suit by complainant herein against Leeds & Baldwin in the Southern District of New York, may be used as taken in this suit; and that defendant's counsel may have the option either to incorporate the cross-examinations of said depositions into the present case, or to have the witnesses produced for cross-examination.

*Dated July 1899.*

*Philip Mauro, Jr.*

Counsel for A. G. Co.

Counsel for U.S. Phonograph Co.

IN THE UNITED STATES CIRCUIT COURT  
FOR THE DISTRICT OF NEW JERSEY.

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AMERICAN GRAPHOPHONE COMPANY

-vs-

In Equity  
(On patents Nos. 341,214  
and 341,288.)

UNITED STATES PHONOGRAPH COMPANY et al.

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PROOFS IN REPLY ON BEHALF OF COMPLAINANT, taken before  
Reeve Lewis, a Notary Public in and for the District of Colum-  
bia, acting herein as Special Examiner by consent, at the  
offices of Philip Mauro, Esq., #620 F. Street, Washington,  
D.C. beginning at 10 A.M. Tuesday July 11th, 1899.

Met pursuant to notice and agreement.

Present:

Philip Mauro, Esq., of counsel for Complainant.

No Appearance for Defendants.

Right of exception is reserved for the Defendants.

WHEREUPON SHELTON T. CAMERON, a witness produced  
on behalf of Complainant, being first duly sworn, and cau-  
tioned to tell the truth, the whole truth and nothing but the  
truth, deposes and says ~~xx~~, in responses the interrogatories  
propounded by Mr. Mauro, as follows:

Q . 1. Are you the Shelton T. Cameron who has previous-  
ly testified in this case?

A - I am.

Q 2 - Have you read the deposition of Mr. William R.  
Vansize, Defendants expert in this case?



A - I have.

Q 3 - Have you read and examined and are you familiar with the various patents and publications, prior to the date of the patents here in suit which are referred to by Mr. Vanzise in said deposition?

A - ~~Examiner~~ I am and have.

Q 4 - Please discuss the said patents and printed publications and state whether in your opinion there is disclosed in them, or any of them, subject-matter of claims 7, 8, 10, 17, or 18 of the patent to Bell & Tainter, No. 341,214, herein suit, or of claim 37 of the patent to Tainter No. 341,288 here in suit. In/answering this question you will please refer to the several patents and printed publications in detail, pointing out any reasons you may have for disagreeing with the conclusions reached by Mr. Vansize, defendant's expert herein, or for your opinion that the ~~xxx~~ inventions defined in the claims of the patents I have mentioned are or are not, disclosed thereby.

A.- In answering this question it <sup>will</sup> ~~shall~~ be convenient to group the several patents and publications for <sup>ready</sup> ~~convenient~~ reference, and for this purpose I shall begin with the ~~xxxxxx~~

PATENTS OF EDISON AND PUBLICATIONS RELATING TO EDISON'S WORK.

Edison patent No. 2522 200,521, Feb. 19, 1878. This is Edison's original patent for recording upon tin-foil or other yielding material. Mr. Edison states in lines 13 to 21, page 1 of the specification, that,

"The invention consists in arranging ~~xx~~ a plate, diaphragm or other flexible body, capable of being vibrated by the human voice or other sound, in conjunction with a material capable of registering the movements of such vibrating body by embossing or indenting or altering such material, in such a manner that such register mark will be sufficient to cause a second vibrating plate or body to be set in motion by them, and thus reproduce the motion of the first vibrating body."

(Italics mine).



I have in my deposition previously given in this case, described a means which Edison <sup>employed</sup> ~~finally adopted~~ for "embossing or indenting" the material which he had ~~finally adopted~~, viz., tin-foil, and have also fully pointed out the defects therein which were responsible for his failure to produce a practical machine for recording and reproducing sounds. These defects, briefly stated, were that the embossing or indentation does not in the first place, constitute a correct record of the sounds to be recorded; second, that the material of the tablet is necessarily <sup>so</sup> ~~as~~ soft, yielding or fragile, that it is distorted by the action of the reproducing style; and third, that it cannot be removed from the cylinder without still further distorting and mutilating the record. Mr. Mansize admits on page 24 of ~~his~~ the type-written copy of his ~~deposition that the indentations in the metal foil were embossed.~~ deposition, that,

"The indentations in the metal foil were embossed." And such is undoubtedly the case. The patent so states in the extract which I have quoted ~~therefrom~~ above. Furthermore, in describing the operation of recording the sounds, the patent <sup>in second column</sup> says, lines 30 to 33, /page 1:

"The tube B is then adjusted towards the cylinder until the indenting point touches the material and indents it slightly."

Clearly this action is that of embossing or depressing the tin-foil into the groove previously cut ~~from~~ the cylinder over which the tin-foil is stretched. The patent contains further evidence that by the use of the words "indent" or "indentation," Edison meant to convey the idea of embossing. For example, he states at the top of the second column of page 2 of the specification that the

"Recording device may be in a sinuous form, resulting from the use of a thread passing with paper beneath the



pressure rollers t, (see Fig. 3, ) such thread being moving laterally by a fork or eye adjacent to the roller t and receiving its motion from the diaphragm G with which fork or eye is connected, and thus records the movement of the diaphragm by the impression of the thread in the paper to the right and left of a straight line, from which indentation the receiving diaphragm may receive its motion."

(The italics are mine).

From ~~this~~<sup>is</sup> paragraph it ~~will be~~ perfectly clear that Mr. Edison uses the word "indentation" as the exact equivalent of the embossed impression formed by the thread in the paper. Again, in lines 60 to 64, page 2 of the specification, Mr. Edison says

"The material employed for this purpose may be soft paper saturated or coated with parafine or similar material, with a sheet of metal foil on the surface thereof to receive the impression from the indenting point."

It is, I think, perfectly evident that the action of a style upon the tin-foil is that of forming and <sup>ed</sup> embossing impression. In Edison's British patent, No. 2909 of 1877, in the passage quoted therefrom by Mr. Vansize on page 14 of the deposition, it is stated that "the vibrations in the diaphragm will be recorded by indenting the foil into the groove." This British patent ~~is patent~~<sup>s</sup> corresponding to U.S. patent No. 200,521, from which I have just quoted, and I think the sentence last above referred to very clearly demonstrates that by "indent" as used in the said patent No. 200,521, he meant that embossing action which results from depressing the tin-foil into the spiral groove <sup>cut</sup> ~~set~~ upon the revolving cylinder.

As I clearly pointed out in my original deposition, this embossing action of a recording style upon a "yielding material" which is the only action described in Edison's patent No. 200,521, is essentially different from that of ~~the~~ cutting or engraving a record in solid resisting material by the action of a cutting style which removes the material from the groove in



~~EXTRACTED~~

"If the paper be drawn along rapidly all the movements of the diaphragm will be recorded by the indentation of the chisel-point on the delicate boss - it having no support underneath it is very easily indented; to do this little or no power is required to operate the chisel, the tones of small amplitude will be recorded by slight indentations, and those of full amplitude by deep ones."

From this Mr. Vansize is enabled to state that, "The embossed rib on the strip of paper was undoubtedly cut into indentations". From this conclusion I wholly dissent for the following reasons. First, it is perfectly clear from the descriptions given by Mr. Edison in his British and American patents, <sup>from</sup> ~~upon~~ which I have heretofore quoted, that his ~~invention~~



method of recording sound consisted in embossing a yielding material by the action of the recording style. Second, the action of sound waves is so feeble that it would be absolutely impossible for them to actuate a style so as to cause it to cut through any material as tough<sup>(as or)</sup> possessing the fibrous nature of paper. The only <sup>possible</sup> ~~probable~~ way in which even a faint resemblance to a record of a sound<sup>wave</sup> could be obtained from an embossed rib of the character described in this Scientific American article would be by doing just what the article says was done, viz., the chisel-point indented the delicate boss, and it was enabled to do this because the boss had no support underneath it and hence was very easily indented by the chisel-point, little or no power being required. I do not therefore regard this article as disclosing a sound record cut in solid or resisting material by the action of a cutting style. But even if it were intended to describe such a record I am of the opinion that it would be wholly impracticable ~~method~~ <sup>(paper)</sup> because ~~the~~ the resistance offered by the recording material to the action of the recording style would render it absolutely impossible to obtain even an approximate record of the sounds impinging upon the diaphragm. In this connection I note that Mr. Vansize gives a definition taken from Webster's dictionary of the word indent, as "to notch; to jag; to cut into points like a row of teeth." I find, however, that in the Century Dictionary, the verb indent is defined twice; in one form it is defined as meaning "to make a dent or depression in, as by a blow or pressure; dent or dent; to dent or press in; formed as a dent or depression." In its second form it is defined as "to make notches in <sup>resembling</sup> ~~resulting~~ teeth"; to cut points or jags like a row of teeth; notch; jag; serrete. I think it will be apparent from what Mr. Edison actually did with his tin-foil phonograph as well as from the fact that he



uses the words "indent" and "indentation" in all of his patents as an equivalent of the words emboss or depression, that the first definition given above viz., -to make a dent as by pressure, -is the meaning or sense in which he uses it. Mr. Vansize states that the Edison recorder could be used as a reproducer, and that Edison so describes it. This is correct, and in itself affords very conclusive evidence that the action of the recording point of the Edison instrument was an embossing action, rather than that of a cutting action. For, if the style were a cutting style, and held in rigid adjustment as the Edison recorder was held, the action of the style when used as a reproducer would be to cut off the undulations or indentations forming the sound record, whereas, if the style was not designed to act as a cutting style but merely meant to rub over the surface of the ~~recording~~<sup>vib</sup> material and indent it when forming a record, it would, when acting as a reproducer, also rub over the record and thereby travel up and ~~run~~ down the undulatory line of the indentations and thus impart to the diaphragm corresponding vibrations, ~~so~~ that it could be used as a reproducer as stated by Mr. Vansize. Manifestly, however, in so doing it would be certain to <sup>o</sup> smooth or iron out the undulations so as to get a very imperfect and unsatisfactory reproduction.

British patent 2909 of 1877.

This patent includes the structure described in the Scientific American article of Nov. 17, 1877, and the Edison U.S. patent No. 200,521. The patent stating

"I am enabled to record the sound produced by the human voice or otherwise by causing the movement of the diaphragm to be registered on paper or soft sheet metal and then the paper may be used in an instrument to reproduce the sound upon a delicate diaphragm by giving to the same a vibration similar to that originally given by the voice."



Throughout  
~~Throughout~~ this specification he refers to "the indenting transmitter", to the raised "indented rib", to the "indentations" which represent the tones of the voice, to the paper as being indented, to the action of the point of the recording style as an "indenting" action, to the recording style as the "indenting" point, and says that "the vibration in the diaphragm will be recorded by indenting the foil into the groove". Notwithstanding all of which Mr. Vansize says that he understand this patent to describe several forms of record tablets with sound records indented therein either by embossing or cutting, or superposing a material. There is absolutely no justification whatever in this British patent for Mr. Vansize's understanding that Mr. Edison forms his ~~xxxxxxx~~ indented record therein by cutting. The mere fact that the indenting style is said to have a knife edge point does not warrant ~~xxxxxxxxxxxxxxxx~~ the conclusion drawn by Mr. Vansize that the indentations are formed by cutting when taken in connection with the fact that its action is referred to continually as an indenting action and one producing indentations. ~~Mr. Vansize refers to an article published in Scribner's Magazine for April 1878, at page 655.~~

Scribner's Magazine Article, April 1878.

Mr. Vansize refers to this article as containing a description of a form of Edison's Phonograph that was placed upon the market. I fail to find in the section quoted anything to the effect that a phonograph of the form described was placed upon the market by Mr. Edison, but I do find a statement to the effect that a sheet of tin-foil or other ~~plastic~~ plastic material is employed to receive the impressions of sound; and the article says that such impressions

"will be stereotyped or electrotyped so as to be multiplied and made durable. x x Having provided thus for the



durability of the phonograph plate, it will be very easy to make it separable from the cylinder producing it and attachable to a corresponding cylinder anywhere and at any time. There will doubtless be a standard of diameter and pitch of screw for phonograph cylinders. Friends at a distance will then send to each other phonograph letters which will talk at any time in the friends voice when put upon the instrument."

He further proceeds to quote from the article to the effect that singers will be induced to sing into the phonograph, that electrotpe cylinders will be placed upon hand organs, that the phonograph will supercede the shorthand dictation, and that phenographic letters will be sent by mail, and then states that he understands this "to be a description of the Edison tin-foil phonograph, a form of which was commercially used at or about the date of the article". I understand this article to be merely a popular description of the tin-foil phonograph which Ed son at that ~~xxx~~ time produced, and which, notwithstanding the fact that it fell far short of producing a practical machine, nevertheless excited great public and scientific interest by reason of the fact that it was the first machine that actually recorded and reproduced sounds. The writer then launches into the realm of fancy and proceeds to indicate what would<sup>be</sup>/the possibilities of any machine which could actually record and reproduce ~~xx~~ sounds in the practical affairs of life. Notwithstanding the hopes ~~of the practical affairs of life with the aid of the phonograph and~~ and expectations that were aroused in the public mind at the time of the publication of the article referred to, there was not produced prior to the date when Bell and Tainter gave the cutting method to the world in the patents in suit, any machine that was capable of fulfilling the prophecies of this Scribner article. There is in the paragraph quoted no justification whatever for Mr. Vansize's statement that it contains a description of a form of the Edison tin-foil phonograph which was commercially used at or about the date of the article. As a matter of fact Edison's tin-foil phonograph was incapable of commercial use because it was incapable



of recording and reproducing in an intelligible manner speech or other sounds. While there was a reproduction of sound, the ~~same in the case~~ <sup>reproduction</sup> of articulate speech was not intelligible unless the words recorded were previously known, and it was for this reason that Mr. Edison and others when giving public exhibitions of the phonograph almost invariably employed familiar nursery rhymes as the subject-matter for the action of the machine. It was owing to its inability to fill the great expectations formed for it that Mr. Edison's tin-foil phonograph soon ceased to attract public attention and descended to the level of a mere scientific toy. I find stated in the issue of Sept. 14th, 1888 of Engineering, a weekly journal published in London, England, ~~an article which~~ a very correct outline of the interest awakened by the original production of Mr. Edison's phonograph, together with a statement of the position which it occupied at the date of the article some ten years later. I quote from said article as follows:

"Engraving Sounds.

Towards the close of 1877, the public mind, which, for ~~the~~ twelve months previously, had been fairly overwhelmed with the discoveries of scientific investigators, was again excited by the announcement that Mr. T. A. Edison had discovered a method of mechanically reproducing speech by means of an instrument which could record and afterwards repeat messages spoken into it.

Under the name of the phonograph this most ingenious apparatus speedily became familiar to every one, and during the Paris ~~Exposition~~ Exhibition of 1878, it, with the telephone, ranked among the principal attractions.

With the profound and simple faith that was so ~~prevalent~~ ~~at that time~~ prevalent at that time in all which emanated from Mr. Edison's ~~laboratory~~ laboratory, a great and useful future was predicted for the invention. Unfortunately, events did not justify this sanguine forecast; the phonograph quickly descended to the level of a scientific toy, the monopoly of which had been acquired by an enterprising London firm. ~~Later on~~ Later on, in the ~~course~~ course of a famous series of law suits, it was found that Mr. Edison's patented claims for the phonograph in this country were included in another and more important patent, the validity of which was therefore jeopardized, and Mr. Edison did not hesitate to cut off and cast out the offending member in order to save the rest of his patent alive. Since that time until recently, we have heard but little of the phonograph; but some few months ago it was confidently stated that the great inventor, having now more leisure on his hands, had again turned his attention to his old speaking machine, and that very soon the world would be startled with a new phonograph which would find a use almost as universal as the telephone.

In due time the new phonograph arrived in this country, and the wonderful ingenuity which has been displayed in



perfecting it, as well as the clearness and precision with which it reproduced spoken records, appeared to justify the claims in part, if not in all, that had been made for it. Instead of the phonogram being indented upon a sheet of tin-foil that had been cemented upon a spirally grooved drum traversing on a screw, the record was engraved upon a small and compact cylinder of paper covered with a film of wax. Under the able management of Colonel Gouraud, Edison's new phonograph has become a source of great interest to a large number of persons who, almost without exception, express themselves as delighted with its performance and sanguine as to its usefulness".

A published interview with Mr. Edison himself, found in the Electrical World, published in New York City, under date of November 12th, 1887, is of especial interest as practically corroborating the statements made in the Engineering Article last quoted, in regard to the failure of the Edison tin-foil machine to practically record and reproduce sound. I quote from the Electrical World, which it will be observed was published some eighteen months subsequent to the issue of the Bell and Tainter patents, as follows:

"Great interest attends the production of the new phonograph, which, it is said, Mr. Edison is about to place upon the market as a perfected instrument. The New York World, of Nov. 6, reports an interview with Mr. Edison and quotes him as follows on the subject:

"Perhaps I am wrong in telling you anything about my phonograph, because what I claim for it is so extraordinary that I get only ridicule in return. I am so confident that when the apparatus appears it will dispel all doubts as to its practicability and working value that I can afford for the present to ignore all kinds of criticism and keep at my work regardless of the storm which I have been raising by telling a few people that there was such a thing as a perfected phonograph in existence.

I am sure that while scientific men may doubt that I have succeeded as well as I say I have, they will admit that there is nothing at all impossible in what I claim, and that the germ of the perfected phonograph, should such a thing appear, is very clear in my old toy of ten years ago, which was exhibited all over the country, and was then acknowledged to be one of the wonders of the century. Just consider for a second what my old phonograph is, and think how little needed to be done to bring it to a working instrument. With my roughly constructed instrument of 1877 I reproduced all sorts of sounds, getting back from the phonograph something like the original sound. Of course, you had to yell into the thing, and the reproduction of conversation was often something of a caricature of the original. Nevertheless to obtain a result that could be understood was doing wonders, and most people who remember my exhibitions will admit that while I did not produce a commercial machine, I made a very interesting and creditable attempt, and my whistling and singing phonograph was a wonder.

There were all sorts of objections in detail to my first instrument. It weighed about one hundred pounds; it cost a mint of money to make; no one but an expert could get anything intelligible back from it;



The record made by a little steel point upon a sheet of tin foil lasted only a few times after it had been put through the phonograph. I myself doubted whether I should ever see a perfect phonograph, ready to record any kind of ordinary speech and to give it out again intelligibly. But I was perfectly sure that if we did not accomplish this, the next generation would. And I dropped the phonograph and went to work ~~upon the electric light~~ upon the electric light certain that I had sown seed which would come to something. For ten years the phonograph has come up in my brain automatically and almost periodically. I would turn it over and over mentally when I had nothing else to think about. When I couldn't sleep at night, when travelling, when worried about business affairs, I would think the phonograph over and jot down any new ideas for future experiments. Eight months ago I began laboratory work upon it again, and a month ago I stopped because I could see no further improvement to be made. It is a finished machine - simple, cheap, effective, not liable to get out of order, and it does everything that I ever hoped the perfected ~~my~~ phonograph might do."

It will thus be seen that the public in general, as well as Mr. Edison, had ~~as late as 1887~~, reached the same conclusion in regard to Edison's tin-foil machine of 1877 and 1878 viz, that it was nothing but a scientific toy; that it was not a commercial machine, Mr. Edison himself stating that no one but an expert could get anything intelligible back from it, and that for ten years it had been lying dormant. From the interview with Mr. Edison it appears that he was at that time preparing to a new and different machine, and by referring to the quotation from the Engineering article, published about a year subsequent to the Edison ~~magazine~~ interview, we learn just what that new machine was, viz, one in which the "record was engraved upon a small and compact cylinder of paper covered with a film of wax, as contradistinguished from a record "indented upon a sheet of tin-foil". In other words, within a few months after the date of the issue of the ~~xxxxx~~ patents in suit, Mr. Edison was preparing to place upon the market as his own, a machine embodying the invention of the Bell and Tainter patent No. 341,214 in suit, that is, a sound record cut or engraved in a tablet of wax or wax-like material. It is also noticeable that the article in Engineering when describing the Edison tin-foil phonograph, very clearly distinguishes between the record made in tin-foil and the one made in wax,



the one being described as "indented," the other as engraved.

Edison's British patent No. 1644, of 1878.

This is a patent containing a large number of briefly described sketches or figures relating in one manner or another to the art of recording and reproducing sound, but the figures being segregated and none of them appearing to be more than fragments, a complete machine being shown in only a few instances. The specification states that :

"My present improvements are for more fully developing and perfecting the device heretofore invented by me and known as the phonograph." ~~The only part of the specification that is of material importance in connection with the present discussion of the patents in suit is as follows~~

The only part of the specification that is of material importance in connection with the present discussion of the patents in suit, is as follows:

"The sound vibrations are made to move a point that by preference is a diamond or other very hard substance and of a peculiar shape. The sound vibrations in the atmosphere act upon a diaphragm or other body capable of motion, and the same moves the indenting point and acts as a phonograph. The indented material is properly designated a phonogram and is preferably metallic.

Sometimes tin-foil is used upon a grooved surface; ~~sometimes tin-foil is used upon a grooved~~ a thin sheet or leaf of metal is placed upon a piece of paper having a surface of paraffine or similar material; sometimes the metallic surface is copper and where a matrix has been made of steel or iron by electrottype deposit or otherwise upon the phonogram, it may be hardened and used ~~for impressing~~ for impressing a sheet or roller of metal, and thereby the original phonogram can be reproduced indefinitely in metal that may be hardened and used for any reasonable length of time to utter the sentence or words or sounds phonetically. x x x It is important that the point used in the phonet correspond in shape to that of the phonograph, but slightly smaller, so as to follow the bottom of the depression without contact upon the sides."

From the portion quoted it will be apparent that in April 1878, the date of ~~the patent~~ the patent under consideration, Mr. Edison was still using an indenting point to indent a material "preferably metallic," and the only two methods he mentioned as being employed are those mentioned in ~~this~~ his U.S. patent No. 200,521, viz, tin foil used upon a grooved surface, ~~and~~ and a surface of paraffine or similar material with the foil placed thereupon. So far as the paragraph



quoted is concerned, it appears then that Mr. Edison had made no advance upon the indented tin-foil record of his first U.S. patent.

On page 7 of the British patent of 1878, commencing at line 24, Mr. Edison states

"Paper or other materials may be used, the same being coated with paraffine or other hydrocarbon, waxes, gums or lacs, and the sheet so prepared may itself be indented, or the material, say paper, may be made to pass through a bath of hot paraffine and thence between scrapers.

This metal foil is now placed on the material, and the sheet passed through rollers, which give it a beautiful smooth surface. The indentation can now be made in the foil and the paraffine or similar material, and the indenting point, does not become clogged with the paraffine in ~~xxx~~ consequence of the intervening foil."

It is to be noted that ~~xxxxx~~ in this paragraph Mr. Edison states that paper coated with waxes, gums etc. may itself be indented, that is the paper may be indented, but it appears from the last sentence in the paragraph quoted that when this was done, difficulty was experienced by reason of the clogging action of the paraffine upon the style, and that therefore Mr. Edison did not obtain a satisfactory record. In order to overcome the difficulty due to this clogging action of the paraffine ~~xxxx~~ Mr. Edison placed upon it a layer of metal foil and then passed the sheet through rollers in order to give it a smooth surface. This being done, he states "the indentation can now be made in the foil and the paraffine or other similar material and the indenting point does not become clogged with the paraffine in consequence of the intervening foil".

Mr. Vansize understands from the ~~xxxxxxxx~~ of quotations above made that "the indentations in the paper coated with paraffine, wax or hydrocarbon were cut or engraved or gouged out or ploughed out," while admitting that the indentations in the metal foil were embossed. In order to arrive at the understanding that the indentations in the wax-coated paper



were cut out or engraved, Mr. Vansize again has recourse to the definition of the word "indent" which he says he finds in Webster's Dictionary, viz:

"to cut into points like a row of teeth".

As I have previously pointed ~~out~~ ~~it~~ out, the word "indent" is also defined as meaning

"to make a dent or depression in, as by a blow or by pressure; dent or dint. To dent or press in; form as a dent or depression".

As I have already ~~pointed~~ pointed out, Mr. Edison throughout his specification in his British and in his American patents, <sup>and</sup> in his published interview, uses the word "indentation" in the sense of depression, and the word "indent" as the equivalent of the word emboss; indeed in the very passages quoted by Mr. Vansize from the British patent No. 1644 of 1878, Mr. Edison says :

"It is important that the point used in the phonet correspond in shape to that of the phonograph, but slightly smaller so as to follow the bottom of the depressions".

I think there can be no doubt that the recording style acted in the same way ~~upon~~ ~~upon~~ upon the metal foil or upon the wax surface in the absence of the metal foil, viz, by embossing or indenting the surface. The practical difference in the two operations being that when the recording style acted upon the wax surface in the absence of the tin-foil it became more or less clogged with displaced particles of wax and was therefore incapacitated for performing its functions with that nicety which is absolutely necessary in a machine which has to deal with vibrations as small as the one thousandth part of an inch and a force as weak as that due to sound waves. However this may be, it is apparent that Mr. Edison himself regarded the action of the recording style upon the wax surface as giving an inferior result to that secured by the tin-foil and proceeds to describe a means for avoiding the difficulty. From the foregoing I think it is apparent that this patent does not disclose a record of sound waves cut or



engraved in a solid or resisting material.

In this connection Mr. Vansize has had made a form of phonograph corresponding as he states to the construction described in Edison's patents No. 200,521 ~~xxxx~~ of 1878, and No. 227,679 of 1880, as well as Scribner's magazine article No. for April 1878, and British patent No. 2909 ~~of~~ <sup>No.</sup> 1877 and 1644 of 1878. He then proceeds to place upon said machine a cylinder one half of which is covered with tin-foil and the other or complementary half of which has a record tablet consisting of a paper foundation coated with a layer of bees-wax and paraffine in the proportions described in the Bell and Tainter patent No. 341,214 in suit. And he states :

"By suitably adjusting the position of the described diaphragm and recording point with respect to the surface of the wax and paraffine record tablet, I am able to produce the same record in all respects similar to that made upon and reproduced from the tin foil, with this difference: that in the process of recording upon the wax and paraffine record the result of the operation is the removal of material to form the record by a cutting, gouging or graving action of the vibrating style and the record is found to be engraved or cut substantially as described in the patent in suit. x

Comparing the results attained I find no superiority or advance of one form of record tablet over the other.

One is embossed, the other is cut or engraved and the style removes the material in the form of chips and shavings, Both reproduce about equally well and both deteriorate with successive reproductions"

That is, after Bell and Tainter had told Mr. Vansize how to do it, he was enabled to take a cutting style and, when operating in connection with the proper mechanism, cut in a tablet of wax or wax like material a <sup>sound</sup> record ~~of~~. It appears however that upon comparing the results attained he found no superiority or advance in the record formed in the wax tablet over the one formed in the tin-foil, and that both reproduced about equally well. It is apparent therefore ~~therefore~~ that he did not get the result of engraving a sound record in wax or wax-like material. The <sup>fact</sup> ~~fact~~ that some of the material of the wax and paraffine coated surface is removed or displaced when the embossing style is in action thereupon, by no means establishes the fact that the action of the style is a cutting



or graving action as distinguished from the displacement which would occur in an embossing action of the style. In the latter case the style would operate to push aside and displace the material and there would doubtless be more or less of the material which would be removed from the surface in this way, but such a removal of the material is essentially different from that which occurs in a cutting or graving action of the style, the former necessarily producing a rough and more or less imperfect record of the movements of the style, whereas in the true cutting or engraving action the record groove is smooth and free from the roughness incident to the mere displacement of the material in ~~the~~ embossing.

I do not find therefore in the British patent No. 1644 of 1878 any description of a sound record cut or engraved in a wax or wax-like material, but I do find that when Mr. Edison attempted to employ such a material for use with his indenting method, that he found it necessary to cover the same with tin-foil and to treat it by a special process before he could attain satisfactory results.

Adjourned to July 12th, 1899 at 11 o'clock.

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Wednesday July 12th, 1899.

11 o'clock.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to Question 4.

Edison's U.S. Patent No. 227,679, May 18th, 1880.

This is Mr. Edison's last contribution to the art of recording and reproducing sounds prior to the date of the Bell and Tainter patents in suit, and he states that it consists in certain improvements upon his ~~patent~~ U.S. patent No. 200,521 and describes the record as one "indented" upon a sheet of "foil or similar material". There ~~is~~<sup>are</sup> described several alleged improvements upon the mechanism of his first patent, but there is no change suggested in the method of recording and reproducing the sound. I do not find in this patent any disclosure of the Bell and Tainter method of cutting or engraving a sound-record in solid resisting material.

The Brooklyn Times Article, Published in 1878.

Mr. Vansize quotes from this article as follows :

"Mr. Edison's assistant, Mr. Bacheller showed me a piece of sheet copper fully one thirtieth of an inch thick which had been wrapped around a cylinder while a small music box, diameter three inches, was placed on the cup that receives the sounds. The touches of the needle point on the copper, while the experiment was ~~now~~ being made, was so light that a microscope of 400 diameters failed to detect the slightest marks, and yet the phonograph gave back that music so clearly that it was heard



distinctly at a distance of 300 feet".

And Mr. Vansize says he understands "from that quotation that the needle point operated to cut or engrave the surface of ~~the~~ the metal". I understand from this quotation that the writer of the article was either a great romancer or else was an exceedingly gullible individual. In the first place it is well known to all of those familiar with the art of recording and reproducing sound that sound waves are too weak to even indent a copper sheet, no matter how soft, so as to give a reproduction with any resemblance to the original sound or of any distinctness whatever. Moreover, if a microscope with a <sup>lense</sup> ~~glass~~ magnifying four hundred diameters failed to disclose the slightest mark upon the surface of the sheet of copper, I would have no hesitation whatever in asserting that no marks existed upon the sheet. I have repeatedly examined sound-records engraved in wax or wax like material with a microscope ~~of a magnifying power of 400 diameters~~ with lenses magnifying from 15 to 30 diameters and the slightest touch upon the face of the wax could be readily disclosed by a lense magnifying 15 diameters, and in cases where a slight particle of dust had been lodged in the surface of the wax and by reason of its fibrous nature had been pulled out rather than cut, the hollow or depression left thereby was plainly visible even though it was many times exceeded in size by the cut of the style which was about the one one-thousandth of an inch deep. But whether this experiment which the reporter of the Brooklyn Times <sup>really occurred</sup> ~~is~~ alleged to have occurred or not, and without any regard to the correctness of the statement therein contained, I have no hesitation whatever in stating that the quotation ~~therefrom~~ made by Mr. Vansize does not contain the faintest hint of a cutting or engraving action and the conclusion he draws from said quotation that the point operated to cut or engrave the surface of the metal is wholly unwarranted. We have in Edison's British patent No. 1644 of 1878



his statement as to how he at that time, (that is at the very date of the Brooklyn Times article) found it necessary to proceed in order to obtain a record upon a metal surface other than foil which was thin enough to be indented or embossed. Page 7 of said patent, line 34, et seq., he states

"If the copper foil or tin-foil with copper surface is used, and a matrix of iron or steel made by electrotpe deposit or otherwise upon the phonogram, such matrix may be hardened and used for impressing a sheet or roller of metal as hereinafter mentioned; thereby the original phonogram can be reproduced indefinitely in metal which may be hardened and used for any reasonable length of time to utter the sentence, or words, or sounds phonetically".

From this it appears that Mr. Edison himself, when undertaking to obtain a record in metal other than in the shape of foil, found it necessary to resort to the electrotyping process <sup>using</sup> ~~upon~~ a previously indented foil.

#### Summary of Edison's Work.

I find from the patents and publications quoted by Mr. Vansize relating to Mr. Edison's work in the art of recording and reproducing sound prior to the date of the Bell and Tainter patents in suit, that Mr. Edison after experimenting with various materials finally adopted tin-foil as the best record material and that he produced his record upon this tin-foil tablet by indenting the same either over a spiral groove cut in the face of the support for the foil, or that he placed the foil over a surface of wax or other hydrocarbon whose yielding character permitted the foil to be indented by the action of the recording style. I find that he sought to employ as his recording material a surface of wax or other hydrocarbon and found the same to be unsatisfactory and was compelled to abandon the use thereof except when ~~the same~~ was covered by the metal foil above mentioned. I find that Mr. Edison took out two United States and two British patents ~~expl~~ explaining his inventions in great detail and that he invariably referred to the action of the recording style as that of "indenting" and his record as an "indented" one.



Moreover I find from the context that he employs the word "indent" in the sense of embossing or impressing, and that the context and the resulting record obtained absolutely ~~for~~ forbid the inference that he at any time cut or engraved the surface of the recording material. So far as the records made in metal foil are concerned, Mr. Vansize states that they were embossed, and to this extent we are in accord. He however states that when the record was made in ~~wax~~ wax or other hydrocarbon, that the record was <sup>cut</sup> or engraved, gouged out or ploughed out, and ~~from~~ <sup>with</sup> this conclusion I emphatically disagree, first because there is absolutely no justification for it in any one of the patents or publications relating to the Edison record; and furthermore even if any of such patents ~~or~~ publications did disclose that Edison had tried or suggested the cutting of wax or wax-like material, I find that he gave to the world as the best form of his sound-record, an indented metal foil and all that can be found in regard to the wax or wax-like surface is the statement by him that such results were defective by reason of the clogging action of the material upon the point of the recording style.

On May 16th, 1888 Mr. Emile Berliner, a distinguished scientist who had given great thought and study to the art of recording and reproducing sound, read a paper before the Franklin Institute at Philadelphia ~~from which I quote the following~~. After stating the manner in which Edison came to invent the phonograph, and stating that Edison intended to "impress a telephone message upon a strip of tin-foil and let the indentations thereby produced act upon a variable resistance" Mr. Berliner continues :

"But, to return to the phonograph, we find this apparatus remained in an unsatisfactory and unfinished condition



for nearly nine years. Among those who believed that ultimately it could be turned to practical account was the well known original patron of the speaking telephone, Mr. Gardiner G. Hubbard; and, being also financially interested in it, he, in 1883, or thereabouts, caused the Volta Laboratory Co., an association originally founded by Prof. Bell as a laboratory, from the funds of the Volta Prize awarded to him by the French Government, to provide ample funds for the purpose of making an extensive series of experiments with the phonograph.

Prominent among the scientists connected with the enterprise were Prof. Bell, Dr. Chichester A. Bell, and Mr. C. S. Tainter. After two years of ardent labors these gentlemen came to the conclusions:

First. That the indenting process had to be abandoned and an engraving process be substituted - i.e., instead of pushing the record surface down with the stylus, as in the original phonograph, it should rather be dug out or graven into.

Second. That the best substance, answering also the various other requirements, was beeswax hardened by an admixture of paraffine or other similar waxy substances.

Third. That loud speaking was impracticable, and that the ordinary conversational tone gave better results, although reducing the reproduction to the loudness merely of a good telephone message.

In Patent No. 341,214, of May 4, 1886, issued to Dr. Chichester A. Bell and Mr. C. S. Tainter, the following claims among others, were granted:

'The method of forming a record of sounds by impressing sonorous vibrations upon a style, and thereby cutting in a solid body the record corresponding in form to the sound waves, in contradistinction to the formation of sound records by indenting a foil with a vibratory style, etc.'

'3. The vibratory cutting style of a sound-recorder substantially as described.

'7. A sound record consisting of a tablet, or other solid body, having its surface cut or engraved with narrow lines of irregular and varied form corresponding to sound waves, substantially as described.

'8. The method of forming a sound or speech record, which consists in engraving or cutting the same in wax, or a wax-like composition, substantially as described'

As a final result of all their labors, there issued in the spring of 1887 the graphophone, the first really practical apparatus of the phonograph type, and which was exhibited to admiring crowds in Washington and elsewhere.

The record ground of this machine is a thin pasteboard cylinder covered with wax.

Soon after the graphophone became generally known, Mr. Edison, evidently encouraged by the results obtained in this instrument, took again to experimenting with the phonograph, and, after trying wax covered with tin-foil for indentation, he abandoned that mode of recording, and also settled upon a cylinder of wax and the graving-out ~~process~~ process, thus confirming the correctness of Bell and Tainter's conclusions, and the new Edison Phonograph and the graphophone appear to be practically the same apparatus, differing only in form and motive power. "

This is a very fair statement of the conditions in which Messrs. Bell and Tainter found the art of recording and reproducing sound and of the practical results of their



labors in that art. They found it in an unsatisfactory and unfinished condition, in which condition it had remained for years, and they presented the world with the "first really practical apparatus of the phonograph type". They did this by abandoning the indenting process and substituting therefor the engraving process, Mr. Berliner very aptly describing the former as "pushing the record down with the stylus as in the original phonograph". Mr. Tainter also ~~points out~~ points out the fact that Mr. Edison was compelled to abandon the mode of recording upon tin-foil and adopted the engraving process of the Bell and Tainter patent in suit, thus producing "the new Edison Phonograph" which is practically the same apparatus as the graphophone, the machine made under the patents in suit.

#### THE CROS PATENTS AND PUBLICATIONS.

Mr. Vansize quotes from the French patent to Charles Cros No. 124,213, delivered July 27th, 1878, the following sentence:

"The patent of Mr. Edison is therefore ineffective with regard to what I have previously published; notably the use of an index closely connected with a vibrating disk, ~~an index~~ cutting its movements on a cylinder having a double, rotary unprogressive movement, in a manner to obtain a helicoidal tracing." ~~Upon referring to the French of~~

Upon referring to the French of the Cros patent I find the words which Mr. Vansize has translated as "an index cutting its movements" to be "index traçant ses mouvements". ~~#Bxxx~~

"Traçant" is derived from the French verb "tracer" to draw, to trace, to trace out, to sketch, and I am at a loss to understand how Mr. Vansize could make so egregious an error as to translate this word as "cutting"; especially do I regard this remarkable when I find that he translated the same word "traçant" a little further along in the same quotation as meaning "tracing". He ~~states~~ quotes further along from the Cros patent as follows:

"The transversely undulating tracing is that which I proposed first. Obtained by lamp-black deposited on ~~a~~ the surface of glass or smooth paper, it is that which requires the least force of the tracing stylus."



The French which Mr. Vansize translates into the English words "tracing stylus" are "style traçant", and his translation of these words as "tracing stylus" is in my opinion correct. I am therefore the <sup>more</sup> at <sup>1</sup>loss to understand why he should, in the paragraph which I first quoted, translate the words "index traçant" as an "index cutting".

Mr. Vansize further quotes at considerable extent from this Gros patent, wherein there is not one word that even suggests a record ~~was~~ cut or ~~was~~ engraved in solid material, and then states that he understands such portions quoted from the Gros patent "to be a description of a sinusoidal, elevated or projecting sound record, originally engraved in lamp-black, which formed a coating on a glass plate." That is, Mr. Vansize finds in the Gros patent a sound record engraved in a coating of lamp black on a glass surface. Mr. Gros himself, in an article deposited with the Secretary of the French Academy of Sciences in 1877, describes the action of his recording ~~stylus~~ style as

"an extremely delicate tracing such as that obtained with a delicate stylus rubbing upon a surface blackened by a flame "

and states that his ~~stylus~~ stylus terminates in a point such as a metallic wire or the barb of a feather. Throughout his article he refers to the line formed in the lampblack as a "tracing" and to the action of the stylus as a tracing action.

This coupled with the fact that the correct ~~translation of the first paragraph of his patent No. 124,213, which is quoted by Mr. Vansize, describes the index (style) as ~~tracing~~ tracing~~ its movement on a cylinder will clearly show that there is no foundation either in Mr. Gros' original paper deposited with the French Academy of Sciences, or his patent No. 124,213, for Mr. Vansize's finding that Gros set forth a record "engraved in lamp-black". Gros said the action was a rubbing action. In fact what he



did was to simply form the old Scot phonautographic record in lamp black by a style rubbing over a blackened surface.

Having obtained this tracing in lamp-black he utilized it in a complicated method by which he sought to transform the phonautographic tracings in relief or in intaglio, in <sup>to</sup> resisting material capable of guiding the moving body which should transmit its movements to a sonorous membrane. There is absolutely nothing to show that the extremely crude and impracticable method suggested by Cros in his original article deposited with the Academy of Sciences, or in his French patent, ever produced a single sound record. Mr. Emile Berliner, from whose paper before the Franklin Institute of May 16th, 1888, I have already quoted, after many experiments conducted with the utmost care, found

"that merely smoked surfaces were utterly impracticable, because, if sufficiently black for a photoengraving, and with the extremely small sizes of waves obtained, with records that are adaptable for the reproduction of good articulate speech, the record lines were ragged and, under a magnifying glass, looked like a set of parallel saws whose teeth would form a grating sound which nearly drowned the articulation".

In other words, when a man skilled in this art undertook to form a record by the means described by Cros, he found that even after long and tedious experiments, it was impossible to succeed.

In addition to the method described by Cros in which he begins by tracing the lines in lamp-black, his patent also disclosed a method by which he substitutes for a surface coated with lamp-black, a metallic plate having upon its surface an insulating material, such as tallow, paraffine, or the like.

The action ~~of~~ of the tracing style displaces ~~the~~ or shoves to one side, the tallow or ~~paraffine~~ paraffine covering the surface of the metallic plate, exposing it to the action of an acid which attacks the metal only where exposed and this action of the acid in eating <sup>to</sup> in the metal is referred to in the Cros patent as an "engraving action".



The Gros patent states:

"The lamp-black can be replaced by a body insulating an underlying ~~metallic~~ metallic plate from the engraving action of an acid. In this case the work of the stylus is increased by the cohesion of the insulating substance. Tallow, paraffine, the varnish of aquae fortis can serve."

Mr. Vansize after quoting this paragraph states that

"the modification here described consists in substituting tallow or paraffine as a coating for the record surface on a metallic plate, causing the diaphragm to cut or engrave a sinuous sound record, that is, one in which the variations in amplitude and vibration are represented by lateral variations, as distinguished from vertical variations, and then causing an acid to eat into the metal whereby the sound record is etched in the well known manner."

There is in the specification of the Gros patent ~~no~~ no justification for Mr. Vansize's statement that the diaphragm is caused to "cut or engrave a sinuous sound record". The tracing in the wax is, so far as the patent discloses, identical with the one formed in lamp black, the only difference being that the surface in the one instance has a thin film of lamp black upon it, whereas in the other it has a thin film of tallow, paraffine, or the like. There is no suggestion in the patent of any cutting or graving action except that of the acid which Mr. Vansize himself properly describes as eating into the metal. Furthermore, it is important to note that the different schemes for forming the sound record which are described by Gros in his paper ~~deposited~~ deposited with the ~~Academy~~ Academy of Sciences and in his patent, are nothing but suggestions which it does not appear ~~to~~ were ever reduced to practical shape by him. So that, in the first place, Mr. Gros' ideas did not involve the idea of cutting or engraving a sound-record in solid resisting material, and in the second place, the ideas which he did advance never seem to have been carried any farther than the mere theoretical statement thereof.

Adjourned to Thursday July 13th, 1899.



Washington, D.C.

July 13th, 1899.

11 A. M.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to Question 4.

In a certificate of addition to his French patent, Cros describes a scheme for causing ~~the~~ a knife, by means of devices which are not fully explained, to ~~strike or~~ impress its self upon ~~the edge of~~ a wire, the knife being actuated by some auxiliary power. Cros ~~ask~~ also describes, in his French patent, a means of registering upon a continuous metallic wire.

The entire description contained in the patent relating to this wire record is quoted by Mr. Vansize. Briefly stated it consists in drawing the wire along a suitable stone anvil having a hole or perforation therethrough, the wire being heated ~~by the~~ to a red heat by an electric current or otherwise and then acted upon while thus heated by the style, which is placed immediately opposite the hole in the anvil. The style indents or imprints the vibrations on the wire when softened by the action of the heat, immediately after which the wire is carried into a ~~liquid~~ liquid which cools it off.

The patent says :

"the more or less intense vibrations are thus represented by depressions or curves more or less accentuated in the the hardened steel wire ".

The description of the patent is not clear enough to enable it to be understood positively what the action of the style upon the wire is, but inasmuch as it states that the point "imprints" the vibrations on the wire, and the further fact that ~~the~~ these vibrations are said to be



"represented by depressions or curves " in the wire, I understand that the style does not cut with an engraving action upon the wire. <sup>but simply acts to bend it while it</sup> In this connection I would again call attention to Mr.Vansize's strange fatuity for misinterpreting the original. Mr.Vansize translates one of the clauses of the description relating to this method of forming a record on the heated wire as follows :-

"If the work of the cutting point on the heated metal is too great to give the required details and fineness the indirect registering may be employed." ~~the~~

Referring to the French original of this patent I find the French for the two words translated by Mr.Vansize as "cutting point" to be "pointe tracante", tracant being ~~derived~~ <sup>verb</sup> derived from the "tracer", which as I have before stated means "to draw, to trace, to trace out, to sketch". Correctly translated then, Gros describes his point not as a "cutting point", but as a "tracing point". I do not deem it of real importance whether Gros traced by embossing or indenting the wire, or whether he cut into the wire by the action of his tracing point, as in neither ~~case~~ case could he be said to produce the record defined by Bell and Tainter in the patents in suit as one cut or engraved in solid material, the patents in suit explicitly stating that by the term "cutting" is meant to indicate an action in which the material is removed in chips, shavings or other small pieces, as in engraving, turning and the like, and not simply displace (see lines 70 - 74, page 6, Bell and Tainter patent No. 342,214). The sentence quoted <sup>from Gros</sup>, however, is of some importance as <sup>affording</sup> ~~being~~ another illustration of the fact that Mr.Vansize finds in every action of a style designed to trace a sound record in any kind of material the ~~equivalent~~ <sup>the</sup> of such cutting or engraving action of the Bell and Tainter patent, and does not hesitate, by mistranslations or otherwise, to warp such descriptions as he finds, from their true meaning.



Edison said that he indented the embossed rid on a strip of paper. Mr. Vansize says he undoubtedly "cut" the indentations

Mr. Edison described an embossing action of a recording style upon a wax-like surface which he found was defective ; Mr. Vansize says that this indenting action of Edison's is that of cutting, engraving or gouging out. Mr. Gros says that he employed an index tracing its movements on a cylinder; Mr. Vansize ~~xxxxx~~ mistranslates this so as to make it read an index cutting its movement. Mr. Gros says he employed a style such as the barb of a feather to trace a line in a lamp-black surface; Mr. Vansize finds that this style engraved the record in the lamp-black. Mr. Gros refers to a tracing point acting upon a heated wire; Mr. Vansize again mistranslates the French so as to make this read that a cutting point acted upon the heated wire.

~~Further quoting from Mr. Gros French patent Mr. Vansize says~~

I take from Mr. Vansize's deposition the following quotation made by him from the Gros patent, referring to a method which Mr. Vansize refers to as one for mechanically duplicating a record. The quotation is as follows:

"A tracing obtained on lamp-black and cut flat, spirally or helicoidal, cylindrically, is taken. "

Correctly translated this sentence should read

"one takes a tracing, obtained in lampblack, and engraved, as a spiral on a plane or helicoidically on a cylinder" .

It is important to note in this connection that this is but another description of the record which Gros has ~~xxx~~ just ~~described~~ previously described as follows:

"Once the tracing obtained by this paper, the cylinder is exposed to the light, to the sun, turning it with a regular movement. At the end of the time of exposure, determined by previous experiments, the paper is taken off it is washed in ether. The tracing is then reproduced by a line of insoluble bitume. The empty metal is ~~renewed~~ coated; the bitume is taken off by a suitable dissolving action (liquid ammonia, for instance) and the engraving is done xxx by an acid. "



It is to this method of forming a record to which Cros refers when he says "one takes a tracing obtained in lamp ~~black~~ black, and engraved, as a spiral on a plane or helicoidally on a cylinder". Continuing Cros says:

"the tracing is an indented one, a point runs along the undulating road, which point is solidly connected with a lever, which can bear with its other end on the wire, resting on the agate with the groove, of which I have spoken, and opposite the small hole. The wire is heated, either by a battery, or simply by a gas blower. The wire is drawn along at a speed adequate to the speed of rotation of the engraved surface. The lever doing its work, every undulation of the engraved line is reproduced in a corresponding flattening and bending in the steel wire, which, cooled as already said, retains these traces definitely".

From this it is perfectly apparent that the only engraved record referred to by Cros is that ~~made~~<sup>formed</sup> by the etching or etching action of an acid, and that a record so etched or engraved is used to actuate a lever bearing a point which flattens and bends the steel wire. This certainly does not disclose a sound-record cut in a solid resisting material by the action of a cutting style which removes the material in the form of chips or shavings, and hence does not disclose the ~~record disclosed by~~<sup>of</sup> the Bell and Tainter patent in suit.

Mr. Vansize, however, is enabled to understand from this "that the master record is first engraved in the lamp-black coating and is then etched or cut in a metal surface".

I neednot again point out that the record in lampblack is not "engraved" but is traced by a suitable style and that there is no warrant outside of Mr. Vansize's mistranslation<sup>for understanding</sup> that the record, after being traced in the lampblack coating, is "cut in the metal surface", unless the action of the acid is referred to as a cutting action, and Mr. Vansize wholly fails to mention the fact that it is the acid and the acid only that etches the groove in the metal surface. Furthermore, Mr. Vansize says "the action of the recording style upon the heated wire would necessarily be an engraving or a gouging or a cutting action", wholly ignoring the statement in the Cros patent



that the "line is reproduced in a corresponding  
~~that the line~~ flattening and bending in the steel wire", a  
wholly different action from that ~~gouging~~ of engraving, goug-  
ing, or cutting.

Adjourned to Friday <sup>July</sup> June 14th, 1899 at  
11 A.M.

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Friday July 14th, 1899

11 A.M.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to Question 4.

In this connection it is interesting to note that Mr. Gros himself gives an estimate of the value of the method of forming a sound record by the photo engraving or by the acid etching methods. Just before describing the method of forming a sound record upon a wire heated to a red heat, he states

"Here now is a very different method from those which have just been described. The entire future of phonography lies in my opinion in the use of this process, at least as far as the repetition of the sonorous phenomena is concerned".

From this it is very clear that Gros himself had never obtained any satisfactory results from the lamp-black photo-engraving, the acid etching, or any other method and that he staked all his hopes of ever successfully recording and reproducing sound upon the method which he then proceeds to describe, viz, that of imprinting the record upon a heated wire.

This is not a method of cutting or engraving and so far as I am aware no sound record has ever been made by the method then proposed by Gros.

La Rappelle Article. December 11th, 1877.

Mr. Vansize quotes at great length from an article published in La Rapelle<sup>a</sup> French publication, issued December 11th, 1877, giving descriptions of Gros' original idea of forming a sound record by first tracing the line in lamp black and then useing this as a means of forming a permanent record.



It would have conducted to a clearer understanding of the exact situation disclosed by this article if Mr. Vansize had included in his quotation the sentence in the article immediately preceding that where his quotation began. I will quote this sentence together with the first paragraph quoted by Mr. Vansize. The article states :

"This is only a project. Are we the institution to hold back our encouragements to that which has been a success? The construction of the instrument in which the idea will be materialized has been proposed to Mr. Braguet, Jr. who became very much interested".

The article then proceeds with a long statement of what will be done in the way of recording and reproducing the sounds suggesting the tracing of a sound line upon a cylinder coated with a plastic substance such as paraffine. Mr. Vansize translates that portion of the ~~explication~~ description which describes the formation of the line in the paraffine, as follows:

"The lines will be gouged out on the same by an index"

This is another one of the glaring inaccuracies of translations which the defendants' expert has resorted in order to give the appearance of a record cut or engraved in solid material, and he himself, later on in his testimony feels called upon to make a defense or explanation. The French corresponding to this portion of the description is as follows:

"Les traces s'~~y~~marqueront en creux".

"Marqueront" is a form of the verb "marquer", meaning to mark, to stamp, to score up, to trace out; and the noun "creux" is properly defined by Mr. Vansize as a "hollow, cavity, pit, hole, chasm, gutter." In my opinion therefore the passage quoted from the French goes no further than to state that "the lines will be traced out in the form of a groove or gutter; there being nothing in the original French to indicate that any



material is removed.

After describing the manner in which it is thought a record may be formed, and which the article has previously stated is 'only a project', the article states;

"Now the final object of ~~the~~ a plate is to give proofs. How will its sound proof be drawn from this one? But there is really only the embarrassment of the choice.

All sorts of processes in fact permit of transforming there open lines on the black ground of the glass into similar lines dug into metal, into steel if you desire.

The operation offering neither difficulties nor novelty, it is useless to linger over details".

It thus appears that this article regarded the transformation of a phonautographic tracing in lamp black into a tracing formed in solid resisting material, such as steel, as a matter of such simplicity that it was not necessary to enter into the details as to how this was to be done. When Mr. Gros undertook to describe his method for performing this simple little trick he described <sup>the</sup> ~~the~~ method of twelve different steps each calling for the utmost care in its ~~xxxxx~~ execution, and later on in his patent he expressed his opinion of this entire method by candidly stating that he thought the entire future of phonography resided <sup>in</sup> ~~in~~ another process, viz, the imprinting or bending of a heated wire by the recording style.

At any rate this article in La Rappel merely professes to describe a project which it states had interested the instrument maker Braguet, and which it says "will be" embodied in a suitable instrument which it regards as <sup>so</sup> simple that it is not necessary to even describe it. I cannot find in this project of the La Rappel article anything that placed the world in possession of the information as to how a sound record was to be cut or engraved in a solid resisting material, notwithstanding the fact that Mr. Vansize says that he understands the description to "embody the cutting of the record in the paraffine coating of a turning and progressing cylinder".

I am the more at a loss to comprehend why Mr. Vansize should understand the article as describing the "cutting" of a record



original French<sup>1</sup>, the cutting or engraving action is not even mentioned. His conclusion can only be explained by recognizing the fact that he seems to consider the words "tracing" "indenting" and the like as exact equivalents of the word "cutting".

~~Before leaving~~

Mr. Vansize also understands from this La Rappel article that it describes a system of duplication, the duplicates to be produced in hard metal and adds

"Of course the necessity for these hard surfaced duplicates was to avoid the deformation of the wax records, which would occur when an Edison reproducer was passed over it".

In the first place this remark of Mr. Vansize's is calculated to be misleading in its use of the term "duplicate". A "duplicate", as the word is used in the art of recording and reproducing sound is a copy of a master record, both the master and the copy or duplicate being capable of actuating a style of the reproducer so as to reproduce the recorded sound, and Mr. Vansize apparently thinks that what he is pleased to call the ~~wax~~ wax record of the La Rappel article could be used to reproduce from in connection with an Edison <sup>reproducer</sup> of that date, viz 1877. The "deformation" of what he is pleased to call the "wax record," which would occur if an Edison reproducer was passed over it would be complete and that too without imparting to the diaphragm of the reproducer any perceptible vibration. Mr. Emile Berliner has ~~xxx~~ experimented extensively in this line, viz, that of tracing the vibrations of a recording diaphragm in a film of wax flowed over a recording surface and has embodied the results of his experiments and inventions in several patents. In his patent No. 382,790, lines 42 to 65, page 1, he states:

"In the course of my experiments I have found that in place of lamp black other substances may be used as the non resisting medium for receiving the original phonographic record, and I have also found that among these substances are such as will resist the chemical action of acids, but which offer no perceptible mechanical resistance to the movement of the recording stylus. ~~xxxxx this~~



Upon this ~~xxx~~ discovery my present invention is based, and it consists, broadly speaking, in producing a phonautographic record through a film of a suitable etching ground deposited upon a travelling surface of resisting material, such as metal or glass, and then subjecting said surface to the action of a suitable etching agent, which attacks said surface at the places only where the etching ground has been removed by the recording stylus.

The etching ground, which is to serve as the non resisting medium for the phonautographic ~~xxx~~ record, I prepare by dissolving bees wax, paraffine, or other like substance in a suitable solvent. By preference I use bees wax and dissolve the same in benzene, so as to obtain a saturated solution".

That is, Mr. Berliner covers his metal plate with bees wax or paraffine and then proceeds to ~~xxx~~<sup>trace</sup> a phonautographic record in the wax thus placed upon the surface of the metal; and he distinctly recognizes the fact that the wax coating upon the metal is a non resisting medium. This being the case it will be readily understood that <sup>a record formed in</sup> such medium could not ~~xxx~~ ~~there~~ be utilized to actuate the diaphragm of an Edison reproducer, and yet this is what Mr. Vansize appears to think could be done when he says the hard surface duplicate was to avoid the deformation which would occur when an Edison reproducer was passed over it.

#### ABBE CARBONEL PROJECTS.

##### The Telegraphic Journal Article, Feby. 1st, 1879.

This article describes the project of Abbe Carbonel for employing a form of albumen spread upon paper or other base as a substitute ~~as a substitute~~ for the wax applied to a copper plate for taking a phonautographic record. This article does not state how the record is to be formed in the albumen coated paper, ~~but leaves it to be inferred~~ but states that <sup>soft</sup> "the/albumen record is afterward hardened in a well known manner, and a hard matrix whose dints vary in depth with the intensity of the sound is obtained". After quoting this article Mr. Vansize, defendants expert, states that the Edison reproducing apparatus, "could undoubtedly be used to reproduce from the cut albumen record". This article has no importance



whatever in itself as disclosing a sound record cut or engraved in solid resisting material ~~and its only importance~~ but it does afford another ~~instance~~ illustration of the remarkable facility with which defendants' expert reads the word "cut" into descriptions without any justification therefor. This article speaks of the "impression" <sup>and</sup> of the "dints", ~~which~~ and these are the only words which afford any idea as to the particular formation of the Abbe Carbonal's albumen record.

~~Mr. Vansize also~~

Cosmos Article, December 1878.

Mr. Vansize quotes <sup>from</sup> ~~this~~ this article, but as ~~that~~ the article is substantially the same as that of Telegraphic Journal of February 1st, 1879 I do not regard it necessary to repeat what I have already said in connection with the latter article.

#### THE DELECHENEAU ARTICLE.

Comptes Rendus Article, Paris, 1879.

Mr. Vansize quotes from this article as follows:

"The arrangement employed by me enables me to obtain, not an embossing, but a real engraving of speech on an unyielding metal.

By putting my apparatus in motion and speaking before the membrane, I have obtained a well marked furrow filled with small well defined dots on zinc and brass cylinders. In order to have a phonograph, the membrane should reproduce the vibrations corresponding to the hollows and ~~reliefs~~ reliefs engraved on the cylinder.

I have not yet performed this operation."

Delecheneau does not state what the "arrangement" employed by him is, and the same is therefore left entirely to conjecture

The same is true of the "apparatus" which he employs. He states however that he gets well defined dots and refers to them as engraved and Mr. Vansize therefore ~~mixes~~ understands the article to describe a sound-record engraved on a solid substance. I do not find in ~~this~~ this article any disclosure of a sound-record engraved on a solid substance. It takes something more than well defined dots to form a sound record.



material

material must correspond in form to the sound waves, and there is nothing in the article to show that the well defined dots said to have been obtained by Delecheneau did correspond in form to sound waves. Whether they did or did not can only be demonstrated by operating ~~them~~<sup>these</sup> in conjunction with a reproducer, and this is an operation which Delecheneau says he has "not yet performed". It is therefore merely a matter of guess work as to whether the well defined dots would have given any reproduction bearing the faintest resemblance to the original sound. In the absence of a clear and well defined statement as to what the apparatus employed by Delecheneau was and of the arrangement of such apparatus when in operation, and with the distinct statement contained in the article that he had not yet performed the ~~ex~~ operation of reproducing sound from the dots which he says he obtained, I have no hesitation whatever in stating that this article affords no justification for Mr. Vansize's understanding that "the article itself describes a sound record engraved on a solid substance", nor can I agree with Mr. Vansize in his statement that there is "no doubt about the reproduction because Edison in 1877 had shown us how to render speech or sound records audible." As it does not appear that Delecheneau succeeded in obtaining a sound record, or in performing the operation of reproduction, although he must have been supposed to be well acquainted with the Edison method of reproducing sound, it is clear to me that there is the gravest doubt as to the reproduction from the supposed Delecheneau record.

#### GAMARD'S PHONOGRAPH.

Telegraphic Journal Article, November 16th, 1879.

Mr. Vansize quotes at considerable length from this article and I extract from said quotations the following sentence :

"On speaking into this new phonograph, on putting the first chariot in ~~ex~~ motion, the voice engraves itself on the metal leaf, and it is only necessary to employ succeeding chariots in order to record the entire discourse".



~~From~~ This article Mr. Vansize says he understands to be "a clear description of an engraved sound record" and yet the only suggestion of an engraved <sup>record</sup> is in the sentence which I have just quoted. The article states that <sup>the</sup> apparatus employs a light leaf of copper or silver, which is referred to in the latter part of the quotation as "copper or silver leaf or tin-foil", but does not specifically define the construction of the apparatus whereby the voice is enabled to "engrave itself" on the metal foil. In view of a more definite description, however, given in the next article quoted by Mr. Vansize, viz. "Le Microphone", it is perfectly evident that the Gamard phonograph described in the article in the Telegraphic Journal placed the leaf of metal foil over a bar having a rectilinear groove formed therein, and that the foil was <sup>depressed</sup> ~~indented~~ into this groove exactly in accordance with the indenting method employed by Edison. The advantage which was sought to be obtained by Gamard's method being that of providing a means for continuously recording an extended discourse, which means consisted of a series of bars with a number of recorders supported on what he calls chariots. It also appears that he proposed to make the foil somewhat heavier than that used by Edison and thereby increase their durability. This understanding of the Telegraphic Journal's article will be made to more clearly appear in treating the quotations from La Microphone.

Le Microphone Article, Gamard Phonograph, 1882.

I quote from this article including portions which appear to have been conveniently overlooked by Mr. Vansize:

"The phonograph of Mr. G. Gamard, which also has a plate, has a rectilinear movement and copper sheets. It is composed of a horizontal plate on which can be placed, one following the other, a series of movable guides to which movement is given by means of a rack fixed on their lower faces and engaging directly with a toothed wheel furnished with a crank. At the center of each of these guides is placed, at will a small bar of copper grooved with a channel, on which is fixed in a permanent



manner (if it is desired) the light sheet of copper or silver destined to received the registration, and it is above this arrangement that the vibrating disk provided with its registering stylus rests. Matters being thus arranged, if a person comes to speak into the phonograph, putting the first guide into operation, the sound is engraved deeply on the sheet of metal, and it is sufficient in order to prolong the experiment as long as it is desired, as in the mechanical pianos of Debain, to cause a sufficient number of guides to succeed one another."

With this full quotation I think there can be no doubt that Gamard's phonograph, is as I have stated above, but a form of Edison's phonograph for indenting upon tin-foil, the difference being that Gamard indents his foil over a rectilinear groove and employs a somewhat heavier foil. I invite particular attention to the statement that a small bar of copper grooved with a channel is employed and that on this is fixed the light sheet of copper or silver destined to receive the registrations. Notwithstanding this very clear statement of the manner of employing the foil over a grooved bar, Mr. Vansize states that he understands it to be a clear description of a record tablet of solid material with a sound record "cut or engraved in its surface" and then immediately proceeds to quote that portion of the article which states that the sheet of copper or silver is sufficient to preserve for a long time the "trace of the lines which have been traced there".

For the reasons stated I am very clearly of the opinion that the Gamard phonograph as disclosed in the Telegraphic Journal and La Microphone articles embodies not <sup>just</sup> but a variation of the old Edison indented tin-foil <sup>phonograph</sup> and wholly fails to disclose the record described in the Bell and Tainter patent in suit which is cut or engraved in a solid or resisting material.

#### LAMBRIGOT'S SIX PENNY PHONOGRAPH.

Engineering Article, April 18th, 1879.

This article states: —

"The whole apparatus which is represented in Fig. 1 consists, first, of a hollow cone of pasteboard about one and one-half inches in diameter whose apex is ~~con-~~



connected to the center of a small sized pasteboard disk by means of a lead wire about 16 inches long; and, second, of a small board or tablet, on which is fixed one, or a large number of short lengths of lead wire, each of which bears upon its upper surface a phonographic embossed record corresponding to a certain word or sentence, by which it was originally produced by a process to be described further on. x x x

The most interesting point connected with this very simple apparatus is the method by which the leaden records are produced, which is as follows: The upper surface of a rectangular prism of glass, or other hard and rigid material, is thickly coated with stearine wax which is then scraped into a ~~xxxx~~ convex form, as shown in the diagram Fig.2, in which a represents the glass bar and b the convex coating of stearine. This bar is then fixed into a simple phonographic instrument, which by means of a screw or other mechanical contrivance traverses it at a suitable speed below a diaphragm. This diaphragm x x is in every respect exactly similar to the diaphragm of an ordinary phonograph. To the center of this diaphragm is attached a thin flat plate whose lower end is cut out to a concave ~~xxx~~ curve to fit the convex surface of the stearine b. When all is properly adjusted, and the temperature is so arranged as to give to the stearine surface the proper degree of hardness to insure the best results, the handle of the instrument is turned and at the same time words are spoken against the diaphragm, which immediately set up in it vibrations, which are communicated to the plate or style. While this is moving up and down following the vibrations of the diaphragm caused by the voice, the stearine coating of the bar a b is steadily ~~ix~~ drawn in the direction of the arrow below the vibrating bar, receiving from it a phonogram similar to that produced on the tin-foil of an ordinary phonograph."

The article then proceeds to describe the means for electroplating the record thus formed on the stearine bar and thus obtaining a matrix into which lengths of lead wire <sup>are</sup> pressed or hammered to obtain duplicate records which are those ~~represented in place on~~ represented in place on the board shown in Fig.1 of the drawing accompanying this article, the matrix being illustrated in Fig.3 and the stearine bar with a diaphragm and style in the act of forming a record thereon being shown in Fig.2.

Briefly stated the method described in this article consisted in coating the surface of a prism of hard material with stearine wax which is then scraped to a convex form and placing a recording style ~~having a~~ formed of a flat strip and having a concavity cut therein corresponding to the convex <sup>surface</sup> of the stearine, placing this ~~style~~ style I say in contact with the stearine and then simultaneously imparting the sound



vibrations to the style and moving the stearine strip rectilinearly under the style, the stearine having first been brought to the proper temperature to enable the style to readily act thereon. The description says "the temperature is so arranged as to give the stearine surface the proper degree of hardness to insure the best results". My understanding of this action is that the temperature of the steaming should be such as to make it soft enough for the style to emboss the record thereon. It was well understood at the date of this article that paraffine was a substance which would easily emboss in the act of forming a sound record. In fact I find in a deposition given by Mr. Thomas A. Edison in the case of the American Graphophone Company v. Leeds and others, in the Circuit Court of the United States for the Southern District of New York, that he quotes from laboratory notes of his that "the ridge x might be of paraffine or other substance which would ~~emboss~~ emboss readily". Both paraffine and stearine are somewhat harder than ordinary bees wax and soften under the influence of heat. Furthermore, if the stearine employed in the Lambrigt phonograph were not softened by heat and an attempt were made to form a record thereon with a style having a bearing surface on the stearine as large as that shown in the drawings, the sound waves impinging upon the diaphragm would be entirely too weak to cause the style to form in the stearine anything more than a few disconnected ~~and~~ impressions, whereas, if the stearine were sufficiently softened under the influence of heat, and the stearine bar were drawn along under the vibrating style as shown in Fig. 2 of the Engineering Article, the same would emboss ~~in a very imperfect manner~~ the surface of the stearine. I am farther confirmed ~~that~~ in my opinion that the action of the style was an embossing rather than a cutting action by an inspection of Fig. 2 of the Engineering Article ~~which~~ which shows the device in operation but does not show any material being removed from the surface of the stearine bar, which would indicate that the bar



was embossed rather than cut or engraved. Again I observe that the article refers to the stearing~~ing~~ bar as receiving from the vibrations of the diaphragm "a phonogram similar to that produced~~on~~ the tin foil of the ordinary phonograph".

As the~~phonogram~~ produced on the tin-foil of an ordinary phonograph is undoubtedly an embossed one, it would appear that this article meant to describe the phonogram ~~fax~~ pro-  
~~duced~~ duced on the stearine as also an embossed phonogram.

For these reasons I am very clearly of the opinion that the article quoted from Engineering does not disclose a record cut or engraved in solid material as the same is defined in the patent No. 341,214 in suit, and I therefore disagree with Mr. Vansize's conclusion that this article ~~describes~~ describes a record cut or engraved in stearine wax.

After quoting from ~~this~~ <sup>this</sup> description in Engineering, Mr. Vansize says :

"Of course this sound record cut~~as~~ as described in the stearing~~ing~~ wax could be used to reproduce directly and audibly the sounds which have made the record. But as is well known, such a record does not withstand reproduction many times as has been demonstrated with respect to the wax and paraffine paper coated record of the patent in suit."

This statement of Mr. Vansize, which I have quoted contains a number of inaccuracies. In the first place there is no sound record described as cut in the stearine wax notwithstanding Mr. Vansize's statement to this effect. Secondly, his statement to the effect that the record formed in the wax and paraffine of the patent in suit does not withstand reproduction many times, and that this is a well known fact, is wholly at variance with the experience of those who have used such records. I myself have seen and heard reproduced records of this general description many times, and it was the experience of those who used the earliest form of the ~~graph~~ graphophone in which the record was cut upon a wax and paraffine tablet ~~that~~ that successful reproductions could be obtained extending up into the hundreds and I therefore disagree with Mr. Vansize's statement that it ~~has~~ has been demonstrated that



such records would not withstand reproduction many times.

In connection Mr.Vansize's statement that this article describes a record cut in paraffine wax, I would call attention to the language of that part of the description in Engineering which relates to the method of forming a copper matrix. X

It says that the copper "bears upon its surface raised striations corresponding to the depressions which were made by the diaphragm on the surface of the stearing. Into this groove is laid a piece of lead wire of about three or four millimeters in diameter, and the two being put into a press and squeezed together, the surface of the lead wire receives a permanent impression which is an exact reproduction of the original impression made on the stearine bar". I think this sentence very clearly demonstrates that the record in the stearine was formed by embossing or impressing the vibrations of the style upon the soft stearine. Mr.Vansize further calls attention to the fact that "Edison is credited in this publication with the production of a sound record on a stearine surface, and that this is in entire accord with the specification of his patent No. 1644 of 1878". With this I entirely agree and point out the fact that such article states that Mr.Edison "produced" a ~~xxxxxx~~ phonogram on a stearine surface", but does not say that he cut or engraved such record; and this statement is therefore entirely in accord with his British patent No. 1644 of 1878. ~~Mr.Vansize quotes~~

Journal, Society of Telegraph Engineers, Lambrigot  
Phonograph, 1879.

Mr.Vansize quotes from this article, but unfortunately fails to give certain portions which are important to a correct understanding of the same, and I shall therefore present the article in full, which shows in the first place that Lambrigot's phonograph was recognized by ~~the~~ Dr.Siemens, whose description Mr.Vansize has quoted, as being but a modifi-



rication of the phonograph. Mr. Vansize also fails to quote that portion of the article contained in the foot note to the effect that the instrument when exhibited failed to work well because of some alleged defect in the lead phonograph (undoubtedly meaning phonogram) . The article entire is as follows:

"Dr. C. M. Siemens - 'We have here this evening a visitor from France - Mr. Hospitalier - who has introduced to my notice, and, I believe, to several other members of the society, a very interesting modification of the phonograph. It is a very simple apparatus, and I have requested Mr. Hospitalier to be good enough to bring the instrument here this evening in order to give the members present an opportunity of seeing it. I may describe it in a few words. It consists, in the first place, of a lead wire upon which certain impressions are engraved. These engravings are produced in the following manner: The phonograph, armed with a knife edge, instead of a point passing over a sheet of tinfoil, passes over a bar of stearine.. This bar of stearine receives the phonographic impression. Upon this bar being covered afterwards with a conducting substance, such as plumbago, a deposit of copper is made by an electrotyping process, and into this mould lead wire is pressed in any convenient manner upon it, and thus stereotype impressions are produced for the phonographic moulding. On passing this little disk of paper over these indentations the word to be repeated is distinctly heard on placing to the ear this little funnel of cardboard, which is connected to paper disk by leaden wire'.

Note. - The instrument was then exhibited, but it did not work well, because there was a flaw in the lead "phonograph". "

This full quotation brings out, as I have stated before, that the instrument exhibited, which was doubtless the Lambrigt phonograph described in the Engineering Article of April 1879, was but a modification of the then recently introduced phonograph whose action was that of indenting on tinfoil, ( Lambrigt ~~indented~~ embossed in stearine) and the further fact which might well have been anticipated that when the instrument was tried it did not work well. It is perfectly evident that this article does not contain anything to show that a soundrecord<sup>cut</sup>/or engraved in a solid material, was known at the date of the Bell and Tainter patent in suit.



Mr. Vansize quotes this article with certain important omissions, drawing from it the unwarranted conclusion that it contains a description of a cutting style. The article in full is as follows: -

"Scientific American

Vol. 39, No. 4.  
p. 60.

(39) F.M. writes: The parts of my phonograph are made as follows: The hollow drum is 3 x 4 $\frac{1}{2}$  inches, with  $\frac{3}{4}$  inch steel spindle 16 inches long, costing at any brass foundry about \$5 or \$6. I have twenty threads to an inch on spindle, and same on drum, but not cut so deep. See Fig. 2. One of the supports of spindle is sawed ~~off~~ apart and drawn together by a bolt, b, causing the thread to cut its own way (nut) in the journal as shown in Fig. 3. the base upon which the whole rests is 1 foot square and 3 inches thick, to give more hold to the uprights and stability to the whole. The disk, c (see Fig. 1) is made of leather covered ~~press~~ board and is clamped between fruit jar rings, d, which are 2 inches in diameter. This disk must be renewed from time to time on account of its getting warped by the moisture of the voice. It gives much better results than the more substantial ferrotype. A very essential part is the proper dampening of disks by pieces of rubber tubing and small cubes of the same material. It is also of great importance to have the needle chisel-shaped, filed off at an angle of 45° to the tangent of the drum. The smallest darning needle is the best ~~making~~ working. The reproduct

ion funnel is 1 $\frac{1}{2}$  foot long and 5 inches wide at the top and  $\frac{1}{2}$  inch at the bottom. It improves the sound if the hole for speaking in top lid is small, and also the space between disk and top lid is not to contain very much air."

If this article be read with the but then recently introduced Edison phonograph in mind, it will be readily understood what is meant by "twenty threads to an inch on spindle, and same on drum, " that is he had a screw spindle just as in the Edison phonograph, the threads being twenty to the inch, and he had a drum as in the Edison phonograph with a  $\rho$  spiral groove cut thereon just as was done in the Edison phonograph, the threads of the spiral being twenty to the inch, but not cut so deep. It is apparent therefore that the instrument described in ~~this instrument~~ had a drum with the indenting groove cut therein, and it is therefore probably an instrument



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sound waves projected against it, and therefore the reproduction will not have the ~~same~~ volume or loudness of the original sounds."

Prior to the date of this patent there had been taken out in the United States but ~~three~~<sup>four</sup> patents for recording and reproducing sound, viz: patents 200,521<sup>201,760</sup> and 227,679 both to Mr. Edison, and one 219,939 to A.W. Hall, and all ~~these~~ of these are aptly described in that portion of the Reynolds specification which I have just quoted. I would note in passing, one important sentence in this specification which shows very clearly what was understood at the time by the experts in the art to be meant by Mr. Edison's statement that he "embossed or indented" his record in tinfoil or other yielding material. Mr. Reynolds' says that the cylinder or plate was "grooved" spirally in order to permit the record sheet to be forced into the groove to raise the record on one side of the sheet while it is sunken or indented on the other side". Clearly Mr. Reynolds does not accept Mr. Vansize's definition of the word "indent" as used in the Edison patent as meaning "to notch, to jag, to cut into points like a row of teeth".

This patent is also interesting as disclosing the defects which were found to exist in the embossed tinfoil phonograph of Edison, its first one, ~~the~~ lack of capacity, was the defect sought to be overcome by the Gamard phonograph which indented in bars having rectilinear grooves thereon, the whole being arranged so that one bar after another could be supplied to the machine. Furthermore, Gamard sought to overcome the defect due to the fragile nature of the foil by using a somewhat stiffer article than that employed in the "American Apparatus", but in so doing he necessarily increased the difficulties due to the fourth defect, viz, the resistance which the record sheet opposed to the action of the recording stylus.

The construction advanced by the Reynolds patent was a mechanism by which it was designed to vibrate the record ~~strip~~ strip, ~~the~~ which was described as a bar of metal, towards a revolving



disk or cutter, the vibrations of the bar being due to the action of the sound waves upon the <sup>diaphragm</sup> ~~disk~~ of the recorder.

This construction is recognized in the Bell and Tainter patent in suit, lines 37 to 45, page 1, the patent stating :

"It has been proposed to cut the record in the edge of a strip of metal or other solid material by vibrating the strip in contact with the cutting edge of a rotary disk; but this proposal is essentially ~~an~~ different from this invention, the new mode being applicable to cutting the record upon all sorts of surfaces and not upon strips only and is, besides believed to be later in time than this invention".

In my opinion this device of the Reynolds patent is wholly inoperative to produce a practical sound-record for the reason that the power of sound-waves is not sufficiently great to vibrate the record strip so as to secure thereon all of the fine variations incident to the weaker tones and overtones, nor is the power of such sound waves sufficient to hold such a disk against the action of a rapidly revolving cutter.

I do not therefore regard said patent as disclosing an operative device for cutting a sound record in solid material.

Mr. Vansize says that ~~he~~ ~~must~~ the sound waves operate in the Reynolds construction to bring the record tablet and the "cutting style" into contact, and in another place he refers to the "rotating cutting style" apparently regarding the rotating disk or cutter as a style. The patent, however, does not so describe it, but refers to the stem D very clearly shown in Fig. 2, as "corresponding to the stylus of the ordinary phonograph".

Mr. Vansize has referred to the Journal of the Franklin Institute, July 18, 1882, as containing a paper read at a meeting of the Institute May 17th, 1882, in which there is a substantial description of the mechanism more fully and at large described in the Reynolds patent and I deem it unnecessary to refer thereto further than to state that I have already pointed out the objections to this construction while discussing the Reynolds patent. .

Adjourned to Saturday July 15th, 1899 at 11 A.M.



Saturday, July 15th, 1899.

11 A.M.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to Question 4.

French letters patent No. 135,688, March 20th, 1880, to Charles Weyher, for Improvements in Continuous Phonograph.

Mr. Vansize quotes at length from this patent to substantiate his understanding that it discloses a "full and clear description sufficient to enable any one skilled in the art to make and use a phonograph in which a burin attached to a diaphragm operates to engrave, cut or gouge out the record in a solid record material". In my opinion this patent discloses nothing more than an apparatus the object of which was to determine in a small wire "deformities corresponding to vibrations impressed upon the wire" by a style. There is no justification in the patent for Mr. Vansize's finding that it operates "to engrave, cut or gouge out" the record.

There might, however, be room for argument in this direction if the original patent justified the translation which Mr. Vansize has ~~xxx~~ injected into his deposition as being an extract from the patent. He has heretofore interpreted an indenting action as the equivalent of a cutting action; he has interpreted the word "engraved" to necessarily describe a cutting action, when patents or publications have used the word "traced" or "tracings" he has read the same as



~~xxxxxxxx~~ cutting or cut; and he now translates the French which properly should be translated as "the edge" as if it were ~~thxxx~~ the equivalent of "the cutting part".

What Weyher really did was to impress the vibrations of a style upon a small wire which was laid, not in a groove, but across a groove in an anvil, so that when the style was vibrated against the wire immediately over the groove, the wire by reason of its lack of support at that point was readily bent or deformed. In order to have the bends or undulations into which the wire was deformed, ~~it was~~

~~necessary to make~~ correspond to the exceedingly minute sound vibrations, it was necessary that the portion of the style which rested on the wire should be drawn to a fine edge, such as is found on a chisel, a knife edge, or a burin.

There is no suggestion in the patent that the edge of the ~~xxxx~~ style was designed for cutting; in fact there is very strong evidence in the patent that it was not so designed.

For the purpose of making this clear, I will quote that portion of the patent quoted by Mr. Vansize, correcting what I regard as his mistranslation:

"The phonograph for which I formulate the present application for a patent for fifteen years, is based in principle on the registering of the vibrations of a stylus on a fine wire of an indefinite length. This wire may be of copper, brass, iron, steel or any other metal, alloy or suitable material. The apparatus is composed of two ~~hi~~ bobbins on one of which the wire winds up, whilst it unwinds from the other. The wire when passing from one bobbin to another, traverses a small anvil, placed beneath the vibrating stylus, which is nothing but a small burin, the edge of which is perpendicular to the wire.

The anvil has a groove also transverse to the wire, and corresponding to the edge of the burin. To allow of exactly regulating the tension of the wire, the bobbins are provided with small brakes which can have any arrangement.

Finally, they are put into motion either by hand, by means of a crank, or by any kind of motor. x x

I desire by the present application for patent to guarantee myself the exclusive property of ~~xx~~ a system of phonograph above described, that is to say, a continuous phonograph, the stylus of which in the form of a burin, acts on a metallic or other wire and impresses thereon the vibration to which it is itself subjected."



7000-10000  
The French noun "tranchant", which Mr. Vansize ~~XXXX~~ translates as "the cutting part", means "the edge". For example, the expression "epee a deux tranchant" means a sword with two edges, a two edged sword. It is true that in a burin the edge is the cutting part, nevertheless Weyher in his patent says edge and not cutting part.

Furthermore he states that he impresses the vibrations of the style on the wire, ~~Not~~ that he cuts the vibrations into the wire, and that such is the <sup>intended</sup> real action of his device is apparent from the fact that he provides an anvil having a groove transverse to the wire, that is, the groove extends across the anvil in a direction substantially at right angles to that in which the wire extends, thereby affording a depression under the wire so that the wire at this point is without support. It will be observed that the patent states that the burin has its edge "perpendicular" to the wire, and that the anvil has a groove ~~has a groove~~ "also transverse to the wire" and "corresponding to the edge of the burin". From this it is quite clear that the edge of the burin extended across the wire at right angles thereto immediately over the groove which is said to be "also transverse to the wire", that is, extends across it as the groove does, both being at right angles or "perpendicular" to the line of travel of the wire. Such being the construction, if the burin as it rests against the wire over the groove is vibrated by sound waves, and the wire is light enough or fine enough, the vibrations of the burin will be to a greater or less extent impressed upon the wire as stated in the Patent. That I am correct in thus interpreting the action of the Weyher device is perfectly demonstrated by a statement that Mr. Weyher himself made in a certificate of addition to this patent, filed but two days after the patent itself, in which he states that his original patent had for its object to "determine in the wire deformations corresponding to the vibrations impressed on the wire"



### DUPLICATE RECORDS.

Heretofore in discussing the patents and publications alleged by Mr. Vansize to anticipate the invention defined in patent No. 341,214 in suit, I have, for the sake of clearness and in order to simplify the discussion, omitted all reference to those features alleged by him to be specifically designed for the purpose of producing what are known in the art as "duplicate" sound records.

In the art of recording and reproducing sounds a "sound record" is a copy ~~in material and~~ of the vibrations imparted by the sounds ~~to be recorded~~ to the diaphragm of the recorder, said copy being formed in material <sup>having</sup> ~~of~~ sufficient resistance to impart like vibrations to the diaphragm of the reproducer.

This copy of the vibrations of the diaphragm of the recorder may be formed in resisting material, either as the direct action of a style connected to the ~~the~~ recording diaphragm, which receives its vibrations from the original sounds, ~~as~~ in which case it is known as an "original" sound record, or a copy may be made in various ways of the "original" sound record in which case it is known in the ~~the~~ art as a "duplicate" sound record. Both "original" and "duplicate" are used for actuating the diaphragm of a reproducer to reproduce the original sounds; and the general term "record" is, and from the foundation of the art of recording and reproducing sound has ~~been~~ been, indiscriminately applied both to "original" and "duplicate" sound records. Thus in the patent to Tainter No. 341,267 in which is described and claimed a sound record in magnetic material, such as iron, the record is first cut in a soft material, such as wax, and then with such soft material as a master or guide, a duplicate is formed by electroplating the wax tablet and using the electroplate copy as a means for



actuating a graving style, which <sup>cut in</sup> engraves a duplicate copy in a suitably prepared iron tablet. This record thus formed in suitable magnetic material, such as iron, is referred to repeatedly in the patent as a "record", and it will be evident that such record is a duplicate record. For examples of this use of the word "record" where it evidently refers to a "duplicate" I would call attention to line 82, page 3, and to claims 2, 4, 6, 10, 11 and 12. In claim ~~11~~ 14 the word "record" is employed in ~~line~~ line 2 to designate a master <sup>be</sup> record "which may either an 'original' or a 'duplicate'" and in line 3 the word "record" refers to the copy which is formed which would inevitably be a "duplicate". Patent to Berliner No. 372,786 is for a process of tracing a phonautographic record in non resisting material, then ~~re~~producing therefrom an engraven record by photoengraving. On page 3, line 8 <sup>Berliner</sup> he refers to such record as "the engraven record". Same page line 38 he refers to said engraven record as "the record".

He applies the term "record" to the engraven record in claim 1 of his patent. Mr. Edison in his patent No. 382,419 describes a process for duplicating phonograms which consists in depositing metal <sup>a</sup> over the record on the recording surface of a cylindrical wax phonogram, and after ~~then~~ melting out the original wax, the remaining <sup>metal</sup> cylinder is divided, and Mr. Edison says :

"I then open the cylinder out flat, or further bend it into the form of a cylinder ~~with~~ with the record upon its exterior".

And in lines 54 to 55 of page 1 he says that the thinness of the cylinder will permit <sup>it</sup> ~~to~~ to be "bent without injury to the record." In both of these quotations from the patent Mr. Edison uses the word "record" as referring, not to the "original" ~~xxx~~ record cut by the actual operation or force of the sound waves in the wax, but to the copy thereof obtained in the metal. I invite particular attention to this as demon-



strating that at about the date of the Bell and Tainter patents in suit, the term "record" was employed by one as well posted in the art as Mr. Edison as including, not only the copy of the sound vibrations formed by the actual power of the sound waves themselves, but as also referring to a duplicate of such copies of the sound vibrations.

In the article describing the Lambrigt Six Penny Phonograph I find the expression

"A large number of short lengths of lead wire, each of which bears upon its upper surface a phonographic embossed record corresponding to a certain word or sentence".

I find in this article the word "record" repeatedly used as referring to the bits of lead wire having the embossed surface, The article referring to the ~~matrix~~ "undulatory surface of the record", to drawing a card-board disk "along the record", to the "markings on the leaden record".

The article states that "the method by which the leaden records are produced" consists in electroplating the stearine wax bar which constituted the "original" record, and using the ~~matrix~~ thus secured as a mould into which the lead wire was pressed to compel it to take the undulations and indentations of the matrix. The statement is also made in the specification that "lead wires each containing the record of a short sentence can be made and sold with a profit of one half penny each".

Manifestly <sup>in</sup> the sentence just quoted the word "record" refers to the "duplicate" formed in the lead wire, the "original" of which was embossed upon the stearine coated bar.

Numerous other instances might be cited ~~in the~~ of the use of the word "record" in the art at or near the date of the Bell and Tainter patent in suit, to designate either an "original" sound record or a "duplicate" sound record, or both "originals" and "duplicates", and it is clearly in the broad sense that the term is used in the description and claims of the Bell and Tainter patent No. 341,214, that is the term "record" applies in said patent not only to an "original" record formed by the actual force of the sound waves, actuating



a cutting or engraving style, but also as well to any copy of the vibrations imparted by the sounds to the diaphragm of the recorder without regard to whether said copy is an "original" or a "duplicate" .

I have referred to the ~~Patent~~ ~~Patent~~ Tainter patent No. 341,287 as describing a means whereby a sound-record formed in suitable resisting material may be utilized as a master for actuating a suitable cutting style operating in conjunction with a record tablet to form a duplicate of the master.

Briefly stated, the mechanism for thus forming a "duplicate" from <sup>on one end</sup> a master record, consists of a lever having a rubbing style or point resting in the sound groove of the master, and on the other end a cutting style in operative relation <sup>with</sup> ~~to~~ a blank tablet upon ~~which~~ which the duplicate is to be formed.

The two tablets being simultaneously set in motion, the cam-like undulations of the master ~~xxxxxx~~ acting through the rubbing style impart <sup>motion</sup> ~~vibrations~~ to the cutting style in contact with the blank tablet, ~~and~~ causing it to cut in the said tablet a record which is the counterpart of the master record.

It is an interesting fact, recognized long prior to the date of the Tainter patent No. 341,287, that an exact counterpart of the undulations of a sound record if utilized to actuate a vibratory diaphragm, will cause said diaphragm to reproduce the original sounds exactly as would be done by the undulations of which it is a counterpart .

In the Engineering Article describing the Lambrigot phone graph/ from which Mr. Vansize has quoted quite extensively, I find the following :-

"It is an interesting fact that if a small stick of wood, such as the stem of a common match, be substituted for the disc shown in Fig.1, and its end be drawn along the copper groove of one of the matrix moulds, shown in Fig.3, articulate speech is communicated equally to the ear piece, although the motion of the point is the reverse of that of the disk; and this bears a very close analogy to the fact that in the ordinary Bell telephone a message is transmitted with equal distinctness whether the poles



of the receiving instrument be reversed or not".

That is, the undulations of the matrix which are the exact ~~counterpart~~ <sup>reverse</sup> of those formed by the original sound record on the stearine wax surface, as well as <sup>of</sup> the undulations formed on the lead wire by the matrix, impart to a reproducing vibratory member vibrations which reproduce the original sound exactly as would the 'original' record in which the undulations are a counterpart of those in the matrix.

For the purpose of illustrating this principle I have had a small wooden model constructed which I herewith produce. In this model the upper portion of the same has a groove cut therein ~~dividing~~ separating the two parts marked respectively A and B. Assuming that the groove represents a sound groove of the zig-zag kind, that is, one <sup>formed</sup> ~~cut~~ in a horizontal plane or flat surface, and that the point of a reproducing style is compelled to travel in said groove, the groove will impart to the diaphragm of the reproducer vibrations corresponding to the undulations of the groove. If now, one of the parts, as the part B, be removed and the vibratory style be forced to ~~xxxx~~ travel along that face <sup>wall</sup> ~~at~~ or side of the groove on the part A, it will be seen that the ~~style~~ <sup>style</sup> and the diaphragm attached thereto will have imparted to it exactly the same vibrations as were given to it by the groove when both walls were present. If on the other hand, the part marked A were removed and the part B were left in position, and a style of a reproducer were compelled to travel along the fact or side wall of the groove on the part B, it <sup>also</sup> would have imparted to it vibrations exactly the same as those which were imparted by the groove with both walls present; but the curves on the parts A and B are counterparts of each other. From the action of a style travelling in the groove of this model, or upon the counterpart walls of said groove



it will be seen that the vibrations imparted by the curves or  
cams which are the counterparts of each other, will produce  
in the diaphragm vibrations which are identical, a fact which  
can be readily demonstrated by reproducing from a "master"  
and a "duplicate" record, when it will be found that the  
reproduced sounds in the two cases are identical showing that  
the vibrations of the diaphragms in the two cases to which the  
reproduced sounds are due must have been identical. In this  
connection it is important ~~xxx~~ to bear in mind that a "vib-  
ration" consists of a full swing of the diaphragm to and fro.

Bearing this in mind it will be readily perceived that the  
exact number, amplitude and order of the vibrations will be  
the same whether such vibrations are caused by the ~~xxx~~ undulat-  
ions of the original record, or by those of the duplicate rec-  
ord which form a counterpart to those of the master. ~~Mrx~~  
~~Edixen~~

Mr. Edison suggested various schemes for forming dupli-  
cates from his indented tinfoil records, prominent among which  
was that of electroplating to obtain a matrix of steel or  
~~xxxx~~ iron which it was suggested could be hardened and  
used for "impressing" a sheet or roller of softer metal, with  
the idea of <sup>duplicating</sup> ~~reproducing~~ the original phonogram indefinitely.

I regard this method, however, as involving so many steps as  
to be impractical in commercial affairs, and as offering so  
many opportunities for departures, however minute, from the  
actual form of the original record, as to necessarily  
result in a <sup>duplicate</sup> record so faulty as to be practically unintelligi-  
ble, <sup>when reproduced</sup> ~~xxxx~~ The history of the art does not disclose any  
successful <sup>duplications</sup> ~~productions~~ of records by Mr. Edison's suggested  
process, and the entire failure of the Lambrigt Six Penny  
Phonograph to give practical results demonstrates the fallacy  
of the theory, it being remembered that this was the method  
pursued by Lambrigt in his efforts to get a sound record upon  
lead wire.



Mr. Vansize refers to a method of duplication described by Cros in his patent No. 124,213, which method consisted in using the sound record which had been engraved by acids upon a metallic plate as a means of actuating one end of a lever, the other end of which was armed with a point which was to bear upon a heated wire which was drawn along under the point, the theory being that the undulations engraved by the acid in the metallic plate would be reproduced in the flattening and bending of the heater wire. The effect of this construction is that in the first place the method described for etching a sound record with acid in a metal plate was wholly inoperative so far as producing an accurate record of the sound waves was concerned. I have already explained the reasons for this inaccuracy. And a further reason why an accurate duplicate would not be produced, lies in the fact that the embossing or imprinting action on the soft wire would not give an accurate copy of the lines traced by the acid in the metallic plate for the same reasons that I have explained in connection with the failure of the indenting method generally. Mr. Edison shows and describes in his British patent No. 1644 of 1876 a method which Mr. Vansize says he understands to "be a clear description and illustration of an operative device for making duplicate sound records by purely mechanical means".

The construction illustrated in Fig. 59 of this patent consists of two cylinders <sup>one of which has</sup> ~~having~~ thereon a suitable yielding material <sup>as tin foil,</sup> to be acted upon by an indenting point, and the other of which has on its surface an indented record in tin foil or other similar yielding material. The two cylinders are placed parallel with each other, and are simultaneously rotated in the same direction. A lever 40 is said to be pivoted to one side of the rollers and is provided with a point c for each cylinder. The theory of the operation of the device is that the point resting upon the undulations of the record will follow the same and impart to the pivoted lever ~~undulat-~~



~~the~~ vibrations corresponding to the undulations of the record, and that the other point attached to the lever and resting upon the blank tablet will therefore impress in said tablet indentations corresponding to those of the original record, thereby producing in the blank tablet a duplicate of the original. This device, however, is wholly inoperative to produce the results specified. If the material in which the record is formed ~~is~~ and of which the blank tablet is composed be ~~is~~ sufficiently unyielding to allow the undulations of the record when acting upon the point c resting thereon to lift the lever 41, it is apparent that the weight of said lever cannot be sufficient to produce any indenting or embossing action in the material, and that therefor upon the supposed downward movement of the lever the point c in contact with the blank tablet upon the cylinder a<sup>4</sup> would not act to indent the tinfoil or other yielding material thereon. If, on the contrary, the material of which the record and the blank tablet are composed be sufficiently yielding to permit the point c resting upon the blank tablet of the cylinder a<sup>4</sup> to indent or emboss it, it will be apparent that such material will not have the resisting qualities to enable the undulations of the sound record upon the cylinder a<sup>3</sup> to actuate the lever. The undulations in this latter case would be entirely obliterated without producing any ~~any~~ effect upon the lever, and hence without causing the same to form a duplicate upon the blank tablet.

Notwithstanding the manifest absurdity of the the ~~any~~ proposed device for forming a duplicate Mr. Vansize states that he understands it to be clear description and illustration of an operative device. From this I entirely dissent, finding the description to be exceedingly meagre and obscure and the device as far as described and illustrated to be wholly inoperative for the purposes named.



Figures 60, 61 and 62 of Edison's British patent No. 1644 of 1878, represent very obscurely, mechanism which ~~it~~ is said to be ~~xxxx~~ designed to produce duplicate phonograms or records. Fig. 60 is meant to be an illustration of the electrotyping process which I have heretofore mentioned, and Fig. 61 is said to represent a roller of hardened metal with the record in relief, it being left to be inferred as to how such a record in relief is to be obtained. ~~It~~ <sup>means</sup> It is sufficient to state, in connection with all three of these figures, that they none of them show sufficient <sup>means</sup> when taken in connection with the description thereof for producing a duplicate sound record which could be utilized to reproduce the original sounds. Furthermore, it does not appear that the alleged constructions are anything more than fragmentary ideas or suggestions on Mr. Edison's part and the fact that the same have never been utilized in practical affairs to produce duplicate sound records is conclusive to my mind that the same are wholly inadequate to accomplish the purpose for which they are designed. ~~Mr. Vansize refers to the Carbonel scheme for forming a sound record in aluminum which was to be hardened in some way not stated, and then used as a master for actuating a lever to~~

Mr. Vansize refers to a duplicating method disclosed in the Reynolds's patent No. 287,166, referring especially to Fig. 8 thereof. This apparatus consists essentially of a lever having unequal arms, one of which has a tracing point designed to bear upon the undulations of the old Edison tin-foil record ~~and to actuate a~~, the other end bearing upon one side of a metallic record strip at a ~~right~~ point opposite a revolving cutter, means being provided for advancing the said strip past the cutter and the end of the lever bearing thereon. In its designed operation the undulations of the tinfoil record are supposed to actuate the style, <sup>on one end of the lever</sup> so as to cause the opposite



end to exert a varying pressure upon the metallic strip constituting the tablet, the end of the lever being held against the tablet by the action of a suitable spring. Mr. Vansize has quoted that portion of the Reynolds patent relating to Fig.8 and I need not here repeat it. I would call attention, however, to the fact that the spring  $S^4$  is calculated to hold the roller  $B^4$  against the metallic strip  $H^4$  with sufficient force to overcome the elasticity in said strip, and that the undulations in the record on the cylinder  $A^2$  are supposed to actuate the lever  $B^3$  to overcome the tension of the spring  $S^4$ , the arm of the lever nearest the record cylinder  $A^2$  being the shorter of the two arms. The device is wholly inoperative for the purposes designed because of the yielding character of the material in which the records of the "old styles of phonographs" were made, Reynolds himself referring to them as "fragile records". I have referred to the strip  $H^4$  as an elastic strip. It is necessarily such or it would not remain in accurate contact with the roller  $B^4$ , which it is essential that it should do if the record cut in the strip by the revolving cutter  $I^4$  is to be an accurate one.

Now it is apparent that the spring  $S^4$  must have sufficient strength to overcome the elasticity of the record strip  $H^4$  and press it against the cutter, and it is apparent that if it is strong enough for this purpose that the spring will be strong enough to cause the point  $b^3$  on the lever  $B^3$  to completely eradicate the record in such yielding material as tinfoil. Especially is this true when it is born in mind that the spring acts with a leverage considerably in excess of that through which the undulations of the tinfoil record act.

I am therefore of the opinion that the duplicating apparatus described in Fig.8 of the Reynolds patent is inoperative for the purposes described because the fragile tinfoil record would not offer sufficient resistance to actuate the lever  $B^3$  against the necessary tension of the spring  $S^4$ .



Mr. Vansize says of ~~the action of~~ this patent that it shows and describes means whereby the sound record upon the original blank may be duplicated upon a blank record tablet said means consisting of a tube containing a column of air under pressure ~~which~~ which connects the reproducing style operating in the sound record with a cutting style operating in the surface of the blank upon which a duplicate is ~~to~~ to be recorded. There is absolutely no justification ~~in~~ in this patent for Mr. Vansize's statement that there is a "cutting style operating in the surface of the blank". There is a style, but as I have repeatedly pointed out in discussing the Edison phonograph of a date prior to the patents ~~in~~ in suit, the style is an indenting, not a cutting style, and the record formed is an indented one on the yielding material which is pressed into a suitable groove provided upon the mandrel of the phonograph.

For the reasons fully stated I fail to find in any of the patents or publications cited by Mr. Vansize any disclosure of a sound record cut <sup>or engraved</sup> in ~~in~~ solid resisting material the material being removed from the record ~~tablet~~ in the form of chips ~~or~~ or shavings as specifically described in patent No. 341,214 in suit.

Q 5- Mr. Vansize alleges ~~as the objections to~~ that with a record tablet of the character described in the Bell and Tainter patent No. 341,214 in suit, viz, one composed of bees wax and ~~and~~ paraffine in the proportions of one part ~~by~~ by weight of beeswax and two parts of ~~of~~ paraffine, the effect of temperature would be such as to greatly vary the extent of penetration of the style and that no limit is described and none is attainable by the mechanism shown, the consistency or condition of the record tablet alone being depended upon to determine the penetration. Please state if you agree with



Mr. Vansize's conclusions, stating briefly your reasons for any ~~opinion~~ opinion you may express?

A - Patent No. 341,214 states, lines 101, to 105, page 3, as follows:

"On the tube or standard 19 is a ring weight, Z which is retained in position by a set screw, 127. It therefore can be adjusted up or down, in order to increase or diminish the pressure of the style 11 against the tablet F".

And in lines 120 - 122, same page, it states that:

"In operation the recorder rests by its own weight, assisted by the pressure of the weight Z, or by its own weight alone, if preferred, against the recording tablet F, said weight causing the style to embed itself to the proper extent in the recording material. The sonorous vibrations impressed upon the style are so rapid, as well as so minute, that the record is made as perfectly as if the recorder were held positively, while at the same time the recorder can be moved bodily to conform to the unevenness of the surface of the tablet, and ~~thereby~~ thus keep uniform the depth at which the style operates."

This demonstrates, I think, that the apparatus is provided with the adjustable weight Z for the purpose of determining the pressure of the recording style upon the tablet. Manifestly the further the weight Z is from the fulcrum or universal joint of the recorder, the greater the pressure it will exert upon the style. It therefore determines the penetration of the style in the tablet, other things being equal. If it is desired to diminish the penetration as might be the case if the temperature was so great as to soften the record perceptibly, then the weight would be moved towards the universal joint, or as the patent suggests dependence might be placed alone upon the weight of the recorder. On the other hand if it is desired to increase the penetration of the style the weight Z would be adjusted toward the head of the recorder, that is, farther away from the joint. I think therefore that Mr. Vansize is incorrect when he states that "no limit is prescribed and none is attainable by the mechanism shown, the consistency or condition of the record surface being alone dependent upon". Furthermore, Mr. Vansize is entirely



is in error when he states that "the recording point would plow to its utmost extent in the surface of a record softened by a high temperature, x x and would enter to a slight extent only when the record was hardened by the temperature of a Winter's day."

Q 6 - Mr. Vansize has stated in detail his reasons for holding that certain patents and prior publications disclose the subjects-matter of claims 7, 8, 10, 17 and 18 of the Bell and Tainter patent No. 341,214, and claim 37 of the Tainter patent No. 341,288. Please state whether you agree with him in the conclusions reached, giving briefly your reasons for any opinion you may express?

A - Claim 7 demands :

"7. A sound record consisting of a tablet or other solid body having its surface cut or engraved with narrow lines of irregular or varied form corresponding to sound waves, substantially as described".

Mr. Vansize states that he finds in Edison's British patent No. 1644 of 1878, a complete anticipation of the subject-matter summarized in this claim. I wholly disagree with him for the reason, as I have heretofore pointed out, that Edison's patent No. 1644 wholly fails to disclose a sound record "cut or engraved" in the sense in which these words are used in the patent in suit, the patent stating that :

"The term cutting is herein employed to indicate an action in which the material is removed in chips, shavings, or other small pieces - as in engraving, turning and the like - and not simply displaced."

I have pointed out in detail that the action of the Edison recording style was an indenting and not a cutting or engraving action, and it does not therefore anticipate the terms of claim 7.

Mr. Vansize refers to the Le Rappel of December 11th, 1877, and quotes the passage wherein occurs the mistranslation to which I have directed attention in my answer to question 4,



where a word that should have been translated "traced" is made to read "gouged~~out~~". The particular paragraph is as follows:

"The registering of the voice will be effected on a turning and progressing cylinder, which cylinder is coated with a plastic substance, such as paraffine; the lines will be traced (Mr. Vansize says "gouged out") on the same by an index actuated by a lever with unequal arms which will amplify its movements."

This sentence merely describes the ~~tracing of the old~~ tracing phonautographic ~~recording on a thin film of~~ on a thin film of paraffine, which tracing was subsequently etched out by an acid to form the record in a metallic tablet. Furthermore, Mr. Vansize fails to quote the opening sentence which states that this is "only a project". For the reason therefore that this does not even suggest a record cut or engraved in a tablet or other solid body, and for the further reason that even if suggested it does not appear that it was ever carried further than a suggestion, being as the article states "only a project", I do not regard the Le Rappel article as disclosing the subject-matter of ~~xxxxx~~ claim 7.

Scientific American Article, November 17th, 1877.

Mr. Vansize argues that because this article describes a chisel point that it necessarily follows that the record was cut or engraved in the paper <sup>having the</sup> with its embossed V-shaped ridge.

I have pointed out that the action was an indenting action, that the paper was readily indented because it had no support <sup>under the crest of the embossed rib</sup> immediate support, and that it would be impossible for a force as ~~xxxxxxx~~ small as that of sound waves to cause a ~~xxxx~~ style to cut a fibrous material such as paper with the accuracy necessary to the formation of a sound record. Since this article does not disclose a record cut or engraved, but an indented one, and since the action of the mechanism therein described could not possibly have been the cutting action necessary in the formation of a sound record on paper, I have no hesitation in stating that this article does not disclose the subject-matter of claim 7.



Edison's British patent No. 2909 of 1877.

My remarks in regard to the Scientific American Article are equally applicable to ~~this~~<sup>the</sup> disclosures of this patent.

Franklin Institute Journal, July 1882.

and  
Reynolds Patent No. 267,166 of 1883.

As these are both for substantially the same construction I shall treat them together. I have pointed out in my answer to question 4 that a force as small as that due to the action of sound waves would not be sufficient to vibrate the recording tablet of metal against a revolving cutter with the accuracy ~~which would~~ and precision necessary for the formation of a sound record. Moreover, this does not ~~not~~ disclose or profess to disclose a sound record in the form of "narrow lines". ~~If any~~<sup>no</sup> record at all would be formed by the apparatus disclosed by Reynolds it would be in the form of jags or notches cut on the edge of the strip, and not in the shape of narrow lines of irregular or varied form, as demanded by claim 7.

Brooklyn Times Article. 1878.

Mr. Vansize says that he understands that the needle point described in this article "necessarily operated to cut or engrave the surface of the metal with narrow lines of irregular or varied form corresponding to sound waves". I have pointed out that if these lines could not be discovered by a microscope which magnified 400 diameters, they probably did not exist at all. Moreover, there is nothing in the article to indicate that the action of the needle point was other than that of the indenting action found in all of Edison's structures of that time. The article also wholly fails to disclose narrow lines and wholly fails to indicate whether they were of regular or irregular form. I therefore



have no hesitation in stating that this article does not disclose the sound record described in claim 7.

Gros' French patent No. 124,213, of 1878.

Mr. Vansize's statement that in this patent the gracing obtained in lamp black was "engraved" by a style which Gros himself states may be the barb of a feather is too absurd to be worthy of serious ~~xxx~~ consideration.

The line is simply traced in the lamp black, and this line subsequently ~~uses~~<sup>used</sup> as the means of securing a record in resisting material such as metal.

Referring to the modification in which Gros traced his line in a thin film of insulating material on the metallic sheet, the film consisting of ~~of~~ tallow, paraffine or the like, and then etched the record in the metal plate by the action of an acid along the exposed ~~line~~ tracing, Mr. Vansize says "to avoid the perishable character of the coating, that is, its deterioration under the form of reproduction described, Gros intended to etch the metal cylinder or surface with an acid." If Mr. Vansize understands this construction as this quoted sentence would indicate he understands it, he has wholly failed to comprehend Gros' idea. It is an essential feature in this modification which Gros describes that the ~~the~~ insulating film of tallow or paraffine should be so thin as to be practically non-resisting; and it ~~is~~<sup>was</sup> absolutely impossible to utilize it, or rather the tracing formed in it, for the purpose of reproducing sound. Gros did not even suggest any such idea, and Mr. Vansize's statement that it is to avoid the perishable character of the coating, that is, its deterioration under the form of reproduction described, is without any foundation in Gros description. Notwithstanding which Mr. Vansize states that "it is obvious beyond question that the direct reproduction described by him and that made known by Edison in 1877, was applicable to reproduce the sound record directly from the cut or engraved sinusoidal line".



Furthermore Mr. Vansize states that the record appears "in narrow lines of irregular or varied form corresponding to sound waves". ~~Exx~~ So far from this being true, the tracing appeared in this film of wax as a line of regular and unvaried form. This will be evident from the fact that in order that the ~~xxx~~ resistance to the action of the tracing style, offered by the film of wax, may be uniform, it is necessary that the film be of even thickness, and since in order that the tracing may leave the metal plate exposed for the action of the acid, it must penetrate to the bottom of this film, it will be evident that the line which it traces will be of regular or <sup>un-</sup>varied form, that is, a cross section of a line taken at one point will be substantially the same as a section taken at any other point, its depth and its width both being uniform.

The "form" of the line is regular, but it is zig-zag in direction. Mr. Vansize evidently fails to distinguish between form and direction.

~~the~~ Cros patent a description of a  
Mr. Vansize also quotes from the form of phonograph wherein a heated wire is submitted to the action of a vibrating diaphragm, whereby the vibrations are imprinted upon the wire while hot, subsequent to which it is cooled. Mr. Vansize then quotes from the patent as follows:

"If the work of the cutting point on the heated metal is too great to give the required details of fineness, the indirect registering will be employed".

I have already pointed out that the French word which Mr. Vansize translates "cutting" should be translated "Tracing", <sup>is</sup> ~~print~~ so that the point ~~xxxxx~~ ~~he~~ described not as a cutting but as a tracing point. The evident action of this point is to emboss or bend the wire while heated, or as the patent itself says "imprint" the vibrations on the wire. It certainly does not state that the record is "cut" in the wire; furthermore it does not appear that the record on the wire is in the form of narrow ~~xxx~~ lines of irregular or varied form, as stated



by Mr.vansize, and as demanded by claim 7. There is therefore in my judgment nothing contained in the Gros patent which discloses a sound record cut in a solid body in the form of irregular or varied lines corresponding to sound waves.

Telegraphic Journal, February 1879.  
and  
Cosmos Article, December 1878.

These both refer to the record formed in albumen which is afterward hardened in some manner not described.

There is no suggestion that the record is cut, and there is no description as to whether the record is formed in the shape of lines, or whether the lines are regular or irregular, notwithstanding which Mr.vansize refers to the albumen record as a "cut" record, and states that the Abbe Carbonel describes a record of such a character that the operation of the style cut or engraved narrow lines of irregular or varied form corresponding to sound waves. The only indication as to the manner in which the record is formed, found in either one of ~~these~~ these articles is such as to leave the impression that they were indented. The Telegraphic Journal says the "dints vary in depth", and the Cosmos Article says the "indentations are more or less "deep". The Abbe Carbonel record, formed in some way not described, but indicated as being indented, and without anything to tell us whether the lines are of irregular or varied form or not, certainly does not disclose a sound record cut or engraved in solid material, demanded by claim 7.

Delecheneau Phonograph, Comptes Rendus, Vol.88, p.1144  
1879.

This article states that by the "arrangement" employed the real engraving of speech on a yielding material depends.

It does not describe what the arrangement is, but states that by putting the "apparatus in motion" (without describing what that apparatus is) that a well marked furrow filled with small well defined dots on zinc and brass cylinders is obtain-



ed. The article states that in order to have a phonograph "the membrane should reproduce the vibrations corresponding to the hollows and reliefs ~~engraved~~ engraved on the cylinder"; and adds "I have not yet performed this operation". There is no suggestion here as to lines, whether narrow or broad, regular or irregular, and there is absolutely nothing described to enable one to understand what the apparatus or arrangement is by means of which the alleged dots were obtained.

Furthermore, the article contains the distinct statement that the operation of reproducing from this alleged record has not been performed, so that it is impossible to know whether or not such dots corresponded to sound waves, and yet Mr. Vansize makes the rash statement that he understands this "to be a description of a sound record consisting of a tablet or solid body having its surface cut or engraved with narrow lines of irregular or varied form corresponding to sound waves". There is not a single material part of this alleged understanding of Mr. Vansize's for which there is the least justification in the article referred to. I have no hesitation in saying that this article has no bearing whatever upon the novelty of the sound record defined by claim 7.

Gamard Phonograph, Telegraphic Journal Article, and  
Microphone Article.

I have pointed out in my answer to question 4, that the Gamard phonograph, so far as these publications described the same, consist of a sheet of foil somewhat heavier than the tinfoil employed by Edison, which, instead of being placed over a spiral groove, was placed over a rectilinear groove ~~xxxxx~~ formed in a copper rule, The style being supported on a suitable carrier or "chariot" as it is described, to ~~xxxxx~~, travel over the surface of the foil and indent it precisely as was done in the Edison phonograph. I therefore wholly dissent from Mr. Vansize's statement that the surface of the



tablet in the Gamard phonograph is cut or engraved with narrow lines of irregular or varied form corresponding to sound waves. The lines were not cut at all, but were simply indented in a heavy foil.

Lambrigt Six Penny Phonograph, Engineering April 1879  
and

Journal of Society of Elxxx Telegraph Engineers 1879.  
Le Microphone, Le Telephone and Le Phonograph, 1879.

In my answer to question 4 I have pointed out that the record obtained by Lambrigt upon the stearine wax surface was an embossed one, and that so weak a power as that of sound waves would be wholly unable to "cut or engrave" so extensive a surface as the one involved in the Lambrigt record. There are no "lines" cut in the wax at all, and the record when formed does not consist of lines, but consists of a convex surface of considerable extent which is alleged to correspond to the sound waves. Notwithstanding this fact, Mr. Vansize states that the lines are <sup>as</sup> narrow, as the cutting style, and are of irregular or varied form corresponding to sound waves. There is nothing in ~~his~~ <sup>these</sup> article to justify his assertion that there is a cutting style, nor is there anything upon which to base his statement as to the record being the form of lines, regular, irregular or otherwise; moreover it ~~xxx~~ appears from the article in the Journal of Society of Telegraph Engineers that when an attempt was made to show the operation of this alleged phonograph before a society of gentlemen well calculated to understand and appreciate <sup>it</sup> ~~that~~ it had really done the work for which it was designed, ~~that~~ <sup>?</sup> it failed to reproduce sounds owing to some defect in the record. And I cannot regard this embossed or moulded stearine wax surface, or the ~~record this embossed or moulded stearine wax surface, or the~~ lead ~~reproduction~~ duplicate secured therefrom ~~as disclosing a~~ and which failed to reproduce the original sounds when put to the test, as in any way disclosing the novel form of sound record defined by claim 7.



Weyher, French Patent No. 135,688, of 1880.

As I have previously stated, the operation of the Weyher construction was to impress upon a wire "deformations" corresponding to sound waves; or as the certificate of addition, filed two days later than the original patent, describes the operation of the original patent

"the object of this disposition was to determine in the wire deformations corresponding to the vibrations impressed on the wire". I

In fact this Weyher phonograph differed from the continuous wire record described by Gros, and in which he said he regarded the entire ~~the~~ future of phonography to be ~~wrapped~~ wrapped up or embodied, only in the fact that Gros heated his wire, whereas Weyher did not. In neither case was there a record cut or engraved, and <sup>in</sup> neither case was the record ~~which was~~ secured in the form of ~~narrow~~ narrow lines of irregular or varied form.

I therefore fail to find in any of the ~~xxx~~ patents or publications alleged by Mr. Vansize to disclose the subject-matter of claim 7, anything negating the novelty of the construction therein defined.

Claim 8 is as follows:

"8. A sound record consisting of a tablet or solid body having its surface cut or engraved with a number of lines or variable cross section, the irregularities or variations corresponding in form to sound waves, substantially as described".

I have discussed all of the alleged anticipatory patents or publications which Mr. Vansize cites against this claim in connection with claim 7, and I shall only repeat here that none of the said patents or publications ~~or~~ ~~xxx~~ disclose the subject-matter of claim 8 because none of them disclose a record corresponding to sound waves cut in solid ~~or~~resisting material; moreover none of them disclose a record



In the shape of lines of variable cross section, the irregularities or variations corresponding in form to sound waves.

I would also remark that not a single one of the alleged prior disclosures of the record defined in claims 7 and 8 ever gave to the word a commercially practical sound record from which intelligible speech could be reproduced.

Claim 17 reads as follows:

"17. The sound record in the form of an irregular groove with sloping walls cut in solid material, substantially as described."

Mr. Vansize relies upon the same publications and patents cited by him in connection with claim 8 as anticipating the subject matter of <sup>this</sup> claim. I have already pointed out that none of the said patents or publications disclose a sound record cut in solid material, and while the Edison indented tinfoil record groove may have had sloping walls, it is one thing to form a groove with sloping walls by indenting a metal ~~and~~ foil, and quite another thing to form such groove by cutting the same in solid material. Mr. Vansize ~~states that~~ asserts that the patent No. 341,214 in suit states that any form of cutting tool that removes the material in chips or shavings results in producing a groove with sloping walls.

I fail to find any such statement in the patent. In fact, a style which would remove the material in the form of chips or shavings and yet form a groove with vertical walls, might be very readily employed; but the groove when so formed would not possess the ability to guide the reproducing style into the most advantageous position for reproducing.

Claim 17 in my opinion clearly defines subject-matter not disclosed by any of the patents or publications cited by Mr. Vansize.

Adjourned to Monday July 17th, 1899 at 11 A.M.



Monday July 17th, 1899

Met Pursuant to Adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to question 6.

Claims 10 and 18 are as follows:-

"10. The sound or speech record cut or engraved in wax or in wax-like composition, substantially as described.

18. The sound record cut or engraved in wax or wax-like composition in the form of an irregular groove with sloping walls, substantially as described."

Unlike claims 7, 8 and 17, claims 10 and 18 specifically state that the material in which the record is cut or engraved, is wax or a wax-like composition. Prior to the date of the Bell and Tainter patent many efforts had been made to obtain a record of sound-waves in some material <sup>offering</sup> ~~having~~ sufficient resistance to enable it to perform the mechanical operation of operating the style of the reproducer. No record had ever been found which would do this. Efforts had been made to form the record in material offering sufficient resistance <sup>to the reproducing style</sup> but the trouble was that such material also offered so much resistance to the action of the recording style that even an approximately correct record could not be obtained. The nearest approach to success was Edison's tin-foil record which he ~~himself~~ designated as an old toy which no one but an expert could use, and as is well known this record possessed so many inherent defects, such as failure to secure a correct record of the vibrations in the first place, and failure to impart such as were secured to the diaphragm of the reproducer in the second place, that it was regarded by the ~~the~~ world as a failure from a commercial point of view, and was ~~only~~ recognized as of interest as a scientific demonstration of the



fact that sounds could be recorded and reproduced. Edison thought that if this generation did not succeed in perfecting the phonograph so as to make it a ~~practical~~ commercial machine, the next generation would.

I will discuss the patents and publications alleged by Mr. Vansize to disclose the subject-matter of the claims 10 and 18.

Edison British patent No. 1644, of 1877.

~~Mr. A. I.~~ I have repeatedly pointed out, this patent shows the employment of paper coated with paraffine or other hydrocarbons, waxes and etc. as the yielding surface upon which Edison attempted to indent his record and failed because the paraffine or waxes clogged the point of the style and he was therefore compelled to place a sheet of tin foil above the paraffine or wax coating, the wax merely performing the same office that the groove in his cylinder did, that is, afforded a ~~yielding~~ <sup>which permitted</sup> support ~~for~~ the tinfoil <sup>to yield</sup> and enabling <sup>ed</sup> the style to perform its indenting action. Even if Edison had tried to "cut or engrave" a record in this wax or paraffine, the patent cited shows the efforts to have been a failure. But Mr. Edison did not attempt to cut the record, but to indent it, and failed even in this.

Gros Phonograph, Le Rappel Article and French patent 124,213 of 1878.

The Le Rappel article starts out with the statement that its description relates "only to a project", and in neither the Le Rappel article nor in the French patent does Gros describe a record cut in wax or wax-like material.

He first describes the phonautographic tracing obtained by placing the vibrating style in contact with a surface covered with lamp black and then states that he may substitute for the lamp black an insulation consisting of tallow, paraffine



or the like. This insulation is necessarily in the form of a very thin film and the tracing style acts thereon precisely as it did on the lamp black coating. There is no suggestion that the style cuts or engraves, in the first place, and in the second place the style does not form a sound "record" as that term is understood, and was understood at the date of the patent No. 341,214 in suit, that is, a copy of the vibrations imparted by the sounds to the diaphragm of the recorder, said copy being formed in material of sufficient resistance to impart like vibrations to the diaphragm of the reproducer.

The tracing formed in the wax was merely the first step in a complicated process which was calculated to result in the formation of a sound record by <sup>forming in a</sup> ~~insulating~~ suitable resistance material a groove corresponding to the tracing obtained in the first step of the method or process. I am well aware that Mr. Vansize makes the statement that this tracing, or "record" as he is pleased to call it might be utilized to reproduce sounds employing the Edison reproducer described in <sup>Edison</sup> ~~the~~ patent No. 200,521, but I have no hesitation whatever in asserting that this proposition is an absurdity, and that the reproduction of sound from the tracing in the wax-like film was an impossibility. I do not regard the Gros phonograph therefore as disclosed in the Le Rappel <sup>article</sup> or in his French patent as in any way anticipating the record cut or engraved in wax or wax like composition defined in claims 10 and 16 of the patent No. 341,214 in suit.

Abbe Carbonel Phonograph, Telegraphic Journal 1879,  
and

Elle Cosmos, 1878.

As I have before remarked in connection with claim 7, there is nothing to show <sup>how</sup> ~~that~~ the record which the Abbe Carbonel describes as formed in soft albumen was made. from the fact that <sup>reference is made</sup> ~~it refers~~ to the "dints" and "indentations" of the record, it may be inferred that the record was indented; but



whether this is true or not can only be surmised. It certainly does not appear that the record was cut or engraved as required by the terms of claims 10 and 18, and yet in the entire absence of any statement as to how the record is formed in the soft albumen Mr. Vansize says that it contains "a description of a sound record cut in wax or wax-like composition."

I note however, that Mr. Vansize in answer to X Q 99, admits that it would "be difficult to harden any albumen sufficient to serve directly as a means for operating a diaphragm".

I note also that the description says that the record is formed in the soft albumen and then hardened. Now soft albumen is not either wax or wax-like in those properties which render wax an especially desirable material for a sound recording tablet; that is, the material could not be readily removed therefrom by the recording style in the form of chips or shavings, and I ~~must~~<sup>am</sup> for this reason ~~in~~ of the opinion that a sound record formed in soft albumen is not a sound record formed in wax or a wax-like composition. Inasmuch therefore as it does not appear that the material in which Carbonel is alleged to have formed <sup>his</sup> ~~the~~ record was wax or wax-like, and inasmuch as it does not appear that said record was cut or engraved, and furthermore, as it appears that it was probably indented, I have no hesitation in stating that neither the ~~French patent, nor the~~ descriptions contained in the Telegraphic Journal or the Cosmos Article disclose the subject-matter of ~~claims~~ claims 10 and 18.

Lambrigt Six Penny Phonograph, Engineering, 1879,  
Journal of Society of Telegraph Engineers, 1879, The  
Telephone, Microphone, etc. 1880.

Neither of these articles justifies Mr. Vansize's statement that they contain a description of a sound record in which the vibrations of the diaphragm cut or engrave the surface of the stearine wax. As I have heretofore repeatedly stated, the action of the recording style in the ~~the~~ Lambrigt phonograph



was an embossing or moulding, rather than a cutting or engraving action, and that sound waves do not possess the power to actuate a style of the size and form of that employed in the Lambriot phonograph to cut or engrave a record upon a surface as extensive as that of the convex stearine wax bar.

Weyher French Patent No. 135,688, March 20, 1880.

Mr. Vansize again refers to this patent as an instance of "cutting" the record. I repeat that the Weyher patent does not disclose a cut record, but one in which a wire is bent or deformed, the deformations corresponding to the vibrations impressed upon the wire. Mr. Vansize states "the operation of this apparatus would result in the production of a <sup>s</sup>wound-record in the form of an irregular groove with sloping walls"

I unhesitatingly assert that the operation of the apparatus described by Weyher would not result in the production of any sound record at all, and that if it did produce the sound record alleged in the patent that it would not be in the form of a groove, and hence could not be a groove with sloping walls. It would simply be a bent wire, the bends of which, or as the patent says the deformations of which, would correspond to the vibrations impressed through the style upon the wire. Mr. Vansize states that in Le Rappel, December 11, 1877, in Engineering, April 18th, 1879, in the Journal of Society of Telegraph Engineers of 1879, in Comptes Rendus, 1877, in Gros French Patent, No. 124,213 of 1878, and in other publications, wax or waxlike material had been described for a record surface. In reply ~~xxxx~~ to this I would state that the various publications and patents referred to simply disclose the fact that efforts had been made, and invariably without success, to form a record in some way by the use of wax, but that not one of the methods described in any of the publications or patents cited by Mr. Vansize ever gave to the world a



sound record from which sounds could be intelligibly reproduced, and in my opinion it is therefore of little importance whether attempts had or had not been made to employ wax as a recording surface unless it be to indicate that the use of wax for this purpose was apparently an impossibility.

Briefly stated therefore, I fail to find in any of the patents or publications cited by Mr. Vansize any disclosure of a sound record as defined in claims 7, 8, 10, 17 and 18 of patent No. 341,214 in suit.

Adjourned to Tuesday July 19th, 1899.



July 19th, 1899.

11 A.M.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Cameron continues his answer to Question 7.

Claim 37 of the Tainter patent No. 341,288, reads as follows:

"37. A recording tablet consisting of a hollow cylinder provided with a wax or wax-like coating and having a sound record cut in said coating, substantially as described."

To satisfy the demands of this claim the recording tablet must be in the form of a hollow cylinder, it must have a wax or wax-like coating, and it must have a sound-record cut in said coating. All three of these conditions are essential in order ~~xxxx~~ to comply with the terms of this claim. Mr. Vansize calls attention to a number of patents and publications, which he alleges anticipate this claim. I will discuss them in order.

British Patent to Edison No. 1644 of 1878.

This patent discloses the fact that Edison undertook to form a sound record upon ~~xxx~~<sup>a</sup> surface composed of paraffine, gums, waxes and the like, and it also discloses the fact that he failed by reason of the fact that the wax-like surface clogged the style and he abandoned its use for a record surface of tinfoil. Furthermore Mr. Vansize admits that this record was an ~~indented~~<sup>embossed</sup> record. Inasmuch therefore as Edison's attempt to secure a record upon a wax-like surface was a failure and inasmuch as the only record he did secure was one ~~indented~~<sup>embossed</sup> in tinfoil, it is apparent that it is immaterial whether it is in the form of a cylinder or not, as it lacks two essentials of claim 37 of the Tainter patent, viz, it is not cut, and



it is not formed in a wax or wax like surface. For these reasons I have no hesitation in saying that the British patent referred to does not anticipate the 37th claim of the Tainter patent.

Scientific American, December 15th, 1877.

This article simply describes the Scott phonautograph. Mr. Vansize says the record of sound vibrations was "engraved" in the surface coating of the paper which was wrapped around a copper cylinder, thereby again insisting that the tracing in the lampblack upon the surface of the sheet of paper was engraved. He further states a cylinder of paper coated with another substance, to wit, lamp black, being old, and it being old to coat the surface of paper with paraffine, that the use of a paper cylinder with a wax-like coating would not involve anything but the use of a form and material old in the art. In my opinion this statement of Mr. Vansize's is incorrect first, because a sheet of paper coated with lampblack disclosed in the Scott phonautograph was not a cylinder. It did not have that quality of sustaining itself in a cylindrical form separate and apart from the machinery; and the mere fact that it was wrapped around a cylinder on the machine ~~and~~ did not make it a cylinder. Moreover Mr. Vansize ignores the fact that claim 37 calls for a record cut in the wax like surface and neither the Scott phonautograph nor the <sup>disclaimer</sup> ~~sentence~~ quoted from the Bell and Tainter patent No. 341,214 by Mr. Vansize ~~discloses~~ a record thus cut in a wax-like recording surface.

Edison's U.S. Patent No. 227,679, May 18th, 1880.

This patent discloses a sheet of tinfoil wrapped around a hollow cylinder or mandrel which forms a part of the phonograph itself, and upon which the record is embossed, and Mr. Vansize takes the position that inasmuch as the use of paper coated with wax or wax-like material was well known at



paper with its wax-coating for the tinfoil, would ~~not~~ result in cutting or engraving the sound record thereon by the embossing style. In the first place the substitution of a sheet of paper coated with wax, paraffine and the like, for the tinfoil of the said Edison patent, would not ~~produce~~ give ~~you~~ the record tablet demanded by claim 37 under consideration, that is, a hollow cylinder provided with a wax or wax-like surface. It would simply form a sheet of paper with a wax or wax like surface wrapped upon the cylindrical mandrel ~~of~~ the machine. Furthermore, as I have repeatedly pointed out, the action of the embossing style of the Edison phonograph upon this wax like surface would not result in a record cut or engraved. No such record was known at the date of the Edison patent; Edison himself had failed to secure a record in a surface of this kind. For these reasons I do not regard this patent as anticipating claim 37.

Journal Franklin Institute, July 1882.

This article describes substantially the construction of the Reynolds patent No. 287,166 to which I have heretofore referred, in which a record is cut in the edge of a metal strip. In general terms the article states that the plane of motion of the cutter is at right angles to that of the strip, plate or cylinder against which it is pressed by the pulsations of the diaphragm. Mr. Vansize states that this describes a sound-record cut in the surface of a cylinder. I have already shown that by reason of the weakness of the sound-waves and their consequent lack of ability to do the work which would be required of them in a process of this kind, ~~that~~ the mechanism described by the article is entirely inoperative to <sup>secure</sup> ~~produce~~ the described results. Moreover, it does not appear that a single sound record was ever produced by the apparatus described in this article, and it is further differentiated from the subject-matter of claim 37 in that it ~~does~~ does not disclose a record cut in a wax or wax-like material.



Brooklyn Times Article, 1878.

I have already pointed out that the writer of this article was either a great romancer or else a very gullible individual, and that a cylinder on which ~~was~~ a microscope with a lense magnifying 400 diameters failed to detect the slightest mark could not have any marks to detect; and that therefore in my opinion there was no record formed upon the sheet of copper wrapped around the cylinder. But even if a record had been formed upon the copper sheet, there is absolutely nothing in this article to show that it was cut or engraved as distinguished from indented or embossed, and I therefore fail to find in such article any anticipation of the claim ~~which~~ under consideration.

Cros French Patent No. 124,213, 1878.

Mr. Vansize quotes that portion of the patent which describes the modification wherein paraffine, tallow and the like are substituted for the lampblack in the phonautograph, to insulate a sheet of metal, the tracing being first obtained in this film of wax and then acid employed to finally eat the record into the metal surface, and says that this is the description of a cylinder coated with tallow or paraffine in which a sound record is cut. I have heretofore pointed out that the tracing secured in the paraffine or tallow was not a "record" in the sense in which that word was used in the art of recording and reproducing sound; that it was only a tracing which constituted the first step in a process whereby the record was designed to be formed. Furthermore, the ~~xxxxxxxxxxxx~~ tracing is not cut in the paraffine or tallow film, but is traced there~~by~~ by a suitable style which Cros stated might be the barb of a feather. I do not therefore regard the Cros patent as an anticipation of said claim 37.

Carbomel Phonograph.

This does not anticipate claim 37 of the Tainter patent



in suit because it does not disclose a record cut in any kind of material. ~~It simply states~~ The descriptions thereof simply state that the record is formed in soft albumen which is afterwards hardened in a well-known manner. <sup>They</sup> ~~It~~ <sup>do</sup>, however, state that the record has "dints" or "indentations" thereby leading to the surmise that the record was probably formed by the indenting or embossing process. It does not show the cut record nor the wax or wax-like material.

#### Delecheneau Phonograph.

I have pointed out that the description of this phonograph given in the Comptes Rendus Article of 1879, by no means discloses the fact that any record whatever was formed.

In order to determine whether the "well defined dots" which Delecheneau alleges he obtained <sup>on</sup> zinc or brass cylinders constituted a record or not it is necessary to reproduce sound therefrom, and this Delecheneau <sup>says</sup> is an operation which he has not yet performed. Nor ~~has~~ <sup>is</sup> the arrangement and construction of the apparatus by which it is alleged he obtained the well defined dots described ~~is~~ with such precision as to enable one skilled in the art to ~~not~~ construct and operate the same so as to form a like series of dots. I do not therefore regard the Delecheneau phonograph as in any way anticipating the subject-matter of the claim under consideration.

#### Scribner's Magazine, 1878.

Mr. Vansize is of the opinion that the statement in this article that a cylinder covered with various substances which soften by heat were employed as a recording surface, when coupled with the allegation that wax-like material used for recording sound was well known, makes it obvious that the state of the art fully disclosed the subject-matter of claim 37. In reply to this I would state ~~that~~ first, that no sound record capable of practically reproducing intelligible speech was known at the date of this article. Second, that the only sound-record which was even partially practical, viz,



Edison's tinfoil record, was not a cut record as demanded by claim 37; and third, that the only efforts made to utilize a wax-like material as a recording surface were unsuccessful experiments which were abandoned for ~~the~~ tinfoil as the recording surface. I do not, therefore, find in this article even when viewed with the then known state of the art any disclosure of the record defined in claim 37.

I have no hesitation therefore in stating that in none of the publications or patents referred to by Mr. Vansize as anticipating claim 37, whether said patents and publications are taken separately or in the aggregate, do I find the subject-matter of said claim.

Q 8 - In response to question 8 of his deposition, Mr. Vansize indicates a number of points wherein he alleges that the record cylinder or tablet in evidence marked "Complainant's Exhibit Defendants' Duplicate Sound Record" ~~differs~~ differs from the sound record described in patents Nos. 341,214 and 341,288 in suit, without stating that such record is not of "wax or wax-like composition" and without stating that it is not a "cylinder provided with a wax-like coating". He alleges however that the exhibit is composed of metallic soap and that a record tablet of metallic soap as employed by the defendant was patented to Thomas A. Edison in patent No. 430,214, dated June 17th, 1890. Will you please state whether or not in your opinion the metallic soap tablet thus patented to Mr. Edison constitutes a tablet of wax or wax-like material, or is a cylinder provided with a wax or wax-like coating, giving your reasons for any opinion you may express?

A - Without referring to the various properties  
a. wherein metallic soap tablet is alleged by Mr. Vansize to differ from the tablet described in the patents in suit, I



would state that in my opinion, the metallic soap tablet is ~~wax~~ <sup>properties</sup> wax-like in those particular ~~respects~~ which rendered the mixture of beeswax and paraffine described in patent No. 341,214 in suit especially applicable ~~it~~ for use as a tablet upon which to ~~insert~~ cut or engrave a sound record.

It is amorphous, the sound groove may be readily formed therein by removing the material in the form of chips or shavings, it does not clog the operations of the cutting style.

Being like wax in these particular respects, it is immaterial in my opinion whether it differs from wax in other respects or not so far as its use as a material for forming a sound record is concerned. *But in the art of recording & reproducing sound metallic soap is recognized as a wax like material.*

Referring to U.S. patent No. 484,583 granted to Thomas

A. Edison, lines 22 to 26, I find the following statement:

"The recording surface of the phonogram blank, ~~or a stearate~~ is ordinarily of ~~it~~ wax or a stearate, or hard metallic soap or other wax-like material or composition".

*This was after a review of evidence*

I find the same statement in U.S. patent to Edison No. 484,584, lines 21 - 24, page 1; that is, I find that no less an authority in the art of recording and reproducing sound than Mr. Thomas A. Edison, regards metallic soap as a wax-like material. In this characterization of metallic soap as a wax-like material, so far as its employment as a material for a recording tablet in the art of recording and reproducing sound is concerned, I quite agree with Mr. Edison, and for the reasons briefly stated in my answer to the present question.

Q 9 - Mr. Vansize has stated that in his opinion <sup>the</sup> ~~a~~ duplicate ~~sound record~~ "Complainant's Exhibit Defendants' Duplicate Sound Record" does not contain a sound record - that is, a record of the operation of sound within the meaning of the patents in suit. Please state whether in your opinion this is correct, briefly giving your reasons for any conclusions you may reach?



A - In answer to Question 4 I have defined a sound-~~xxxx~~ record as being a copy of the vibrations imparted by the sounds to the diaphragm of the recorder, said copy being formed in material of sufficient resistance to impart like vibrations to the diaphragm of a reproducer. I have also pointed out that in the art of recording and reproducing sound as said art existed at the ~~the~~ date of the Bell and Tainter patent, the word "record" was employed to designate ~~xxxxxx~~ <sup>not only</sup> the copy of the vibrations of the recording style when the same was actuated by the direct force of the sound-waves, but was equally employed when referring to duplicates of the directly formed ~~xxxx~~ record, without regard to the manner in which said duplicates were secured. I see no reason for thinking that Messrs. Bell and Tainter employed the word "record" in any narrower sense than that ordinarily employed in ~~the~~ the art, and inasmuch as the duplicate, even though it is as Mr. Vansize states complementary to, rather than identical with the original record, is a copy of the vibrations imparted by the sounds to the recording style and is formed in material of sufficient resistance to impart like vibrations to the diaphragm of the reproducer, and inasmuch as it acts in conjunction with a reproducer to actually reproduce the sound originally recorded, I have no hesitation in stating that it is a sound record within the meaning of that term as employed in the patents in suit.



*Cameron's Dep'n*

WEDNESDAY, JULY 20, 1899.

Not pursuant to adjournment.

Counsel present as before.

Q. 10. Mr. Cameron are you familiar with the classification followed by the United States Patent Office in classifying talking machines?

A. I am.

Q. 11. Please state under what titles the various patents relating to this art are classified.

A. The only two classes occurring in the classification of the Patent Office are the sub-classes "Graphophones" and "Graphophone Tablets" within which I found all of the machines for recording and reproducing sounds.

Q. 12. Have you, in connection with your study of the art of recording and reproducing sound, investigated the art as the same is illustrated by patents taken out in the United States?

A. I have.

Q. 13. Please state what activity was displayed in the art prior to the date of the Bell & Tainter patent No. 341,214 in suit, and also the activity that was displayed in said art subsequent to the date of said patent.

A. Prior to the date of the Bell & Tainter patent No. 341,214 in suit, there were issued from the United States Patent Office but five patents relating to the art of recording and reproducing sounds, three of which were issued to Mr. Thomas A. Edison for his Tin Foil Phonograph, one for an improvement upon the Edison Tin Foil Phonograph and the fifth was issued to Mr. C. C. Reynolds being the patent No. 287,166 referred to by Mr. Vansize. Subsequent to the date of the issue of the Bell & Tainter patent in suit, the art became very active and more than



two hundred patents have been issued since that date. The five patents I referred to as being issued prior to the date of the Bell & Tainter patent in suit covered a period of nine years, whereas immediately subsequent to the date of the Bell & Tainter patent large numbers of patents for improvements in this art were issued every year.

Q. 14. I will ask you to state if you can, how the Bell & Tainter patent No. 341,214 is viewed by the Patent Office with relation to the art of recording and reproducing sounds?

A. It is regarded by the Patent Office experts as constituting probably the greatest advance in the art that has been made in the history thereof, in fact, they appear to regard it as lying at the foundation of the practical art of recording and reproducing sound. In the year 1896, the then Commissioner of Patents made a report to Congress, reviewing the progress of the industrial art and pointing out in each art those inventions which contributed chiefly to its advancement. In that report I find the following statement:

"The phonograph art, including an active line of invention may be said to have had its origin in 1877. On Feb. 19, 1878, the patent to Edison No. 200,521, was issued. Probably the greatest advance in the art has been the cutting of the record in a solid body (see patent No. 341,214, May 4, 1886 to Bell & Tainter), instead of indenting it by means of the vibratory stylus. By means of this improvement permanent and accurate records are made; and the phonograph is put to many practical uses to which it was not adapted before said improvement."

Official Gazette  
(See United States Patent Office/ ~~Vol.~~ Vol. 75, page 1031)

I regard this as a particularly accurate and happy statement of the results due to the invention covered by the Bell & Tainter patent No. 341,214.



*Hayes*  
~~XXXXXXXXXX~~; August 25th, 1899, 10 A.M.

Met pursuant to agreement.

Present, *M.* W. Hayes, Esq., for defendants,

E.N. Massie, Esq., for complainant.

CROSS EXAMINATION OF MR. CAMERON.

XQ 15. In your consideration of the patents in question, and the claims about which you have testified, have you construed those claims in the light of the prior art as it existed at that time, and in the light of the specifications of the patents?

A. I have.

XQ 16. Do you construe these patents as a whole, giving to the language used the same sense in all portions of the patents?

A. In construing each patent I construe it as a whole, seeking to give to each and every expression found therein the meaning which the patent as a whole shows it was intended to have.

XQ 17. I call your attention to lines 19 to 25, of patent # 341,214 and ask you what, in your opinion, is referred to by the words, "other suitable vibratory mediums"?

A. The electric current referred to in the lines to which you call my attention, is evidently regarded by the patentees as "a vibratory medium", but it is evident that the patentees understood that there might be some other



vibratory medium employed and they therefore afterwards state "or other suitable vibratory medium" as indicating that they do not necessarily limit themselves to the electric current. There is, however, nothing to indicate in the patent itself just what other vibratory medium was in the minds of the patentees at that time, and in the absence of such indication in the patent itself, I would not undertake to state what medium might have been contemplated other than the electric current.

Q 18. Do you understand that the "vibratory medium" referred to is intended to be directly intervened between the sound waves and the cutting style?

A. ~~Examination of the patent shows that the patentees have not stated that the vibratory medium is introduced between the sound waves and the cutting style, or that such is a possible means of utilizing the electric current which is the only vibratory medium mentioned.~~ The patent does not state ~~that~~ the vibratory medium is introduced between the sound waves and the cutting style, ~~or that~~ <sup>nor that</sup> such is a ~~quite~~ possible means of utilizing the electric current which is the only vibratory medium mentioned.

Q 19. I call your attention to lines 75 to 80 p.1, of patent 341,214, and ask you what you understand to be covered by the words "or otherwise"?

A. The portion referred to is as follows:

"The invention consists, thirdly, in cutting or engraving the record in the form of a groove, with sloping walls, the sound waves being represented by elevations and depressions at the bottom of the groove, or otherwise."

I understand the words "or otherwise" to indicate



that the sound waves may be represented otherwise than by elevations and depressions at the bottom of the groove.

XQ 20. Do you know of sound waves ever having been represented in a record in the form of a groove with sloping walls by anything except elevations and depressions at the bottom of the groove/ prior to the date of the patent?

A. In Edison's patent 200,521, February 19, 1878, it is stated that the

"recording device may be in a sinuous form resulting from the use of a thread passing with paper beneath the pressure roller t, (see Fig. 3,) such thread being moved laterally by a fork or eye adjacent to the roller t and receiving its motion from the diaphragm G with which the fork or eye is connected, and thus records the movement of the diaphragm by the impression of the thread in the paper to the right and left of a straight line, from which indentation the receiving diaphragm may receive its motion."

Assuming that a record could be formed in the manner stated by Mr. Edison in the passage just quoted, it would constitute a record in the form of a groove with sloping walls, the sound waves being represented not by elevations and depressions in the bottom of the groove, but otherwise than by elevations and depressions, that is, by the lateral sinuosities. A thread would be pressed into the paper and the groove would take the form of the thread, which being approximately round, or ~~perhaps~~ somewhat flattened by being pressed into the paper, would form a ~~shallow~~ shallow groove whose walls would slope inward and downward.

In the first patent to Cres, French patent 124,213, there are described three theoretical forms of sound groove, one of which has the vertical undulations of the patent 341214



in suit; another is the laterally undulated record groove and is similar to that formed by the sinuous thread of the Edison patent; the third is a simple lineal tracing, which it is unimportant here to describe. This laterally undulating or zigzag record of the Cros patent would have the sound waves represented by something other than the elevations ~~xxxxxxxx~~ and depressions at the bottom of the groove, that is, it would be the lateral sinuosities of the traced line. So far as I remember there is no suggestion, however, that the walls of the groove are sloping. In both ~~of~~ the Edison and Cros patent the sound waves are represented otherwise than by elevations and depressions in the bottom of the groove, but so far as I am aware both of these are merely theoretical presentations of a way in which a sound wave might possibly be formed, and I do not know of anything in the history of the art that indicates that such records ever were actually made.

XQ 21. So far as you know have ~~xxxxxxxx~~ cut or engraved records ~~xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx~~ in the form of a groove with sloping walls, been made in which the sound waves are represented otherwise than by elevations and depressions at the bottom of the groove. In answering this question, please include the condition of the art to the present time.

*not prior to the date of the patent in suit*  
A. They have ~~A~~ The so called "Gramophone" record employ the form of ~~the~~ laterally undulating or zigzag groove of substantially even depth, and such groove, as the same is actually ~~employed~~ <sup>formed</sup> in the records on the market, has sloping walls. The record in this case, however, would



not respond to the terms of the paragraph included between the lines 76 and 80, page 1, of the Bell & Tainter patent 341,214, to which you called my attention in the previous question, as the gramophone ~~patent~~ records are not cut or engraved, but are formed by first etching the record in a ~~patent~~ metal plate which is then used as a die for stamping the record into a plate or disk of softened rubber.

XQ 22. I understand, then, that there is no form of record now known to the art to which the word "otherwise", spoken of, can refer?

A. I certainly did not intend to give you any such impression. The gramophone record is in the form of a groove with sloping walls, and the sound waves are represented otherwise than by elevations and depressions at the bottom of the groove, that is, they are represented by the lateral undulations of the zigzag gramophone record.

XQ 23. You are of the opinion, then, that the word "otherwise" is not limited to cut or engraved records?

A. I do not regard the word "otherwise" as referring to the manner in which the record is formed, that is, whether it is cut or engraved, but as referring solely to the particular form of the record and those parts or undulations which represent or correspond to the sound waves. The patentees were well aware at the date of making their application for patent, that there were other records than the vertically undulating one, in which the sound waves are represented by elevations and depressions in the bottom of the groove, and they therefore took care to make their



statement broad enough to include such other forms of record. The particular inventive idea which ~~it~~ is sought to be stated, and which I think is very clearly stated, in the paragraph referred to, resides in the "cutting or engraving the record in the form of a groove with sloping walls", without regard to whether the groove is a vertically undulating or a zigzag groove, or any other kind of groove; the two essential things being that the record groove should be cut or engraved, and that it should have sloping walls. Any groove, no matter of what kind, character or description, that is thus formed by cutting or engraving, and which possesses sloping walls, falls within the inventive idea expressed in this paragraph .

XQ 24. I call your attention to lines 11 to 13 of page 2 of the patent, in which it is stated that so far as the patentees were aware no one at the date of the patent had reproduced sounds from a wax record by rubbing a style or reproducer over it. From your knowledge of the art at the date of the patent, do you, or do you not agree with the patentees in this statement?

A. From my knowledge of the art, I am of the opinion that the statement in the patent contained in the lines referred to, is correct. The patentees might have gone even further and stated that at that time no one had formed in wax or waxlike material a record from which sounds could be reproduced by rubbing the style of a reproducer over it.

XQ 25. Do you consider a record made on a tablet consisting of paper coated with paraffine a wax record ?



A. It might be and it might not be. If the paper was sufficiently heavy and the coating of paraffine sufficiently heavy, it is entirely possible, as is demonstrated by the apparatus of the patent in suit, to form a sound record in the paraffine itself, and as paraffine is for all substantial purposes in the art of recording and reproducing sound a wax or waxlike material, I should regard a record thus formed as a wax record. But if a thin or light sheet of paper should have thereon a very slight coating of paraffine, so as to make it pliable; in other words, if it was what is familiarly known as paraffine paper, and if the same were placed over a ~~cylindrical~~ support having grooves formed therein, such as is described in the Edison patent 200,521, and in ~~his~~ his British patent 1644 of 1878, and the paper merely indented in the groove, then I should not call this a "wax record" within the meaning of the words as *the same are* used in the lines of the patent 541,214 to which you call my attention. I should rather call it a paper record.

Q. 26. How heavy must the paper be, how thick the paraffine, and placed upon what kind of a support in order, in your opinion, to make a record formed on paper coated with paraffine a "wax record" within the meaning of the patent in question?

A. I would not undertake to state just how heavy the paper could or could not be, nor would I undertake to state any exact limits for the coating of paraffine, further than to state that the action of sound waves is exceedingly weak and the backing of paper must be such as to permit it



to yield under the action of the style vibrated by the sound waves. The particular form of support which I had in mind in answering the last question, was the cylinder described in Edison's American and British patents which I mentioned, said cylinder having a spiral groove cut thereon, over which tinfoil was placed, and into which it was indented by the action of the style. It appears from the statements in Edison's British patent 1644 of 1878, that he attempted to use paraffine paper in the same way that he did the tinfoil, but that such attempts were unsuccessful, because the paraffine clogged the style and prevented it from properly fulfilling its office, and he was therefore driven to the expedient of placing a sheet of tinfoil over the paraffine paper and indenting the foil into the paraffine, instead of into the groove. I should not, however, regard this indented sheet of tinfoil when placed over the paraffine paper as a wax record, but rather as a tinfoil record. I might add that the support need not necessarily be in the form of a cylinder but might be in the form of a plate with right line grooves formed thereon, after the manner of proposed by Gamard in the construction<sup>to</sup> which I in common with defendant's expert, Mr. Vansize, have previously referred.

XQ 2%. If you cannot state exactly what weight of paper, thickness of paraffine, or kind of support is necessary to make a wax record, as distinguished from a paper record, can you state in a general way the characteristics kinds of by which these two records may be distinguished?



*deforming*

A. Where the record is obtained by ~~forming~~ *deforming* the paper the undulations corresponding to the vibrations of sound waves, I should call such a record a paper record without regard to whether or not the paper had paraffine or other wax applied thereto; when, however, the record is obtained by forming in a body of wax or waxlike material the undulations or sinuosities corresponding to the vibrations of sound waves, I should call such a record a wax record without regard to whether the wax was a self-supporting cake or body, or whether it was spread as a coating upon a suitable foundation such as pasteboard, or the like.

XQ 28. I call your attention to lines 33 to 36, on page 4 of the patent in question, and ask you what kind of records you consider are referred to by the words "other suitable records?"

A. Throughout the patent 341,214 in suit, the patentees have continually advanced the idea that while the cut or engraved record formed an important element in the machine as a whole, which they described and claimed, ~~that~~ there were nevertheless other parts of the invention which were capable of useful employment with records other than the cut or engraved record. I have already mentioned the fact that the Cros patent (French) had proposed a record which was not cut or engraved, but was a laterally undulating record formed by the etching action of an acid on a plate of metal, the plate being normally insulated from the action of the acid by a film of tallow or the like, and the record traced thereon, after the manner of the Scott phonautograph. In fact such record has since the date of the patent in suit,



been actually made by Mr. Emil Berliner. Inasmuch as the patentees were men of high scientific attainments and were familiar with the laterally undulating or zigzag form of record, it is fair to presume that they had this, among other possible forms of record, in mind when they used the words "other suitable record", contained in the lines ~~xxx~~ to which you have invited my attention. But the patent itself is silent as to any other particular form of record, and I understand from the statement in the lines referred to, that the patentees merely wish to emphasize the fact that their reproducer, as such, was not limited to use with the engraved form of record, but that they contemplated its use with any form of record known or unknown to them at that time, to which it might be applicable. In other words, they stated that the reproducer embodied in and of itself an inventive idea independent of any particular form of record.

XQ 29. I call your attention to claim 1, in which the cut record is especially distinguished from records made by indenting of foil with a vibratory style, or by cutting a strip by vibrating it against a revolving disk cutter. Do you understand that the other forms of record referred to in the foregoing question, are not limited to the two kinds distinguished in this claim ?

A. Most assuredly *Yes*. The expression "other suitable record", bears no such limitation. Any record that is suitable for conjoint use with the reproducer described in the patent, is properly included in the expression "other suitable record". This is an unusually well drawn



patent, and when the patentees wished to make a reference as specific as that indicated by your question, they did so, as for example, in lines 34 to 45, page 1, of the specification, and in claim 1, wherein there can be no doubt that they refer to the Edison indented tinfoil record and the abortive attempts of Reynolds, as set forth in his patent 237,166 of 1883, and when the patentees use such broad expressions as "other suitable record", I see no reason for taking the words to mean anything different from that which they clearly state.

XQ 30. On line 75, of page 6, of the patent in question, the words "displacement of the material", are used, and that operation is contrasted with the cutting described in the patent. Please state what you understand "displacement of material", as used in the patent, to mean, and how it differs from the cutting described in the patent ?

A. In the Scott phonautograph, where the record was formed by tracing the line in lampblack over a paper or metallic surface with a suitable style such as the barb of a feather, as well as in the acid etched record of the Gros French patent, the material would be shoved to one side or displaced, and small particles thereof might even be removed from the surface of the tablet, and very clearly this displacement of the material was not that which occurs when a groove is formed by using a keen cutting tool which removes all of the material within the groove from the surface of the tablet, in the form of chips or shavings, without in any



way altering or changing the condition of that portion of the material which formed the walls of the record groove. In the cut or engraved record, the material would neither be compacted, crowded to one side, nor formed with raised and roughened edges, whereas when the material is merely displaced by a style which did not act as an engraving tool, the material remaining would be necessarily compacted by the shoving to one side of that portion of the material which had occupied the groove prior to the action of the style, the walls of the groove would be roughened and of irregular density, and the upper edges of the groove would be raised, irregular and rough. The best illustration I can give <sup>of</sup> ~~between~~ the difference <sup>between</sup> ~~of~~ displacement of material ~~rather than~~ <sup>and</sup> the removal thereof, would be the difference between driving a post in the ground with a sledge hammer, and that of forming a hole therefor with a post <sup>auger.</sup> ~~hammer.~~ In one, room is made for the post by forcing the surrounding earth to one side, in the other, room is made for the post by entirely removing the material which had previously occupied the space where the post is to be placed.

XQ 31. Do you understand that when a record is made by the mechanism shown in the patent, that the surface of the tablet is not in any way compacted or crowded to one side, along the groove made by the recording style?

A. With the cutting style in proper operative condition, there should be no compacting or crowding to one side of the record material. Of course it is quite possible to employ a tool in such poor condition, so dull or otherwise



out of order, that some displacement or crowding of the material would occur, but such is not the action contemplated by the invention of the patent in/suit .

XQ 32. In your opinion, is it possible to have a recording style of the character shown in the patent, in such a perfect cutting condition that it will not in recording, to some extent compact or crowd to one side the surface of a tablet of the character described in the patent?

A. It is. I have examined a great many graphophone records under the microscope, and have yet to find a record wherein there was any trace of the material having been crowded to one side or displaced other than by the keen cutting action of the style. Should such crowding action occur, it would be readily noticed, as it would necessarily and inevitably result in slight cracks and roughness in the walls of the groove, and as I previously stated, although I have examined <sup>many</sup> hundreds of such records under the microscope, and followed the groove round and round the cylinder with the utmost care, and have made repeated <sup>micro-</sup>photographs thereof under a high-power glass, I have yet to find a record groove bearing any evidence that the material had been crowded to one side or displaced other than by the action of the style which entirely and cleanly removed the same in the form of chips or shavings.

XQ 33 . In the records you examined with the microscope, if the effect of the action of the style had been to compact the material at the bottom of the groove, would your investigation have discovered that?



A. I think it would, for the reason that the groove does not have a flat but a curved bottom, and any compaction of the bottom of the groove, as distinguished from the side of the groove, would necessarily result in a line of demarkation between that portion which was compacted and that which was not, and this would inevitably produce a crack or a roughness which would be readily perceived under a high power glass.

both the sides and bottom  
XQ 34. If ~~the entire surface~~ of the groove had throughout its entire length, been compacted, would you have discovered it?

A. It would in such case be as readily discernible as in the case which you previously supposed, where it was compacted merely at the bottom, because it would be utterly impossible to have a perfectly uniform compaction throughout the entire length. ~~The only compaction which could occur~~ would result from the vibratory action of the style, and <sup>Such</sup> manifestly ~~the~~ compaction would ~~therefore~~ occur only upon the downward and not upon the upward movement of the style. There would therefore occur a series of compactions which would be greater at one place than at another, depending entirely upon the strength of the sound waves which imparted the downward vibrations to the style, and interspersed between these downward compactions would occur spaces which were less compacted, and you would have as before necessary lines of demarkation between the compacted portions, which are the result of a strong or heavy sound wave, and those which were the result of a light or weak sound wave, and there would necessarily occur between these portions having differ-



~~xxxxxxxxxxxx~~

ent degrees of compaction, minute cracks or roughnesses, which would be readily discernible under a high power glass, and would materially injure the reproduction therefrom.

XQ 35. In the case supposed in your answer to XQ 31, of a tool so dull that some displacement or crowding of the material would occur, would you consider the action of such a tool to be cutting or displacing?

A. I should call it an imperfect cutting action.

XQ 36. You would consider, then, that any tool which in such a case removed part of the material of the tablet, to have imperfect cutting action; is that correct?

A. It is not, and I have made no such statement. A cake of tallow scratched by a pin would be liable to <sup>have</sup> ~~remove~~ <sup>removed</sup> some of the tallow, as is a matter of common experience, and yet the action of the pin certainly is not a cutting or engraving action within the meaning of the term as employed in the patent in suit. Edison's indenting style, in the abortive experiment of indenting upon paper coated with paraffine, must have removed some of the paraffine, because the experiment proved a failure by reason of the clogging action of the paraffine upon the style, and yet clearly the action of his style was indenting, not a cutting or engraving action. Such incidental removing of material is a very different thing from the cutting or engraving action, <sup>by</sup> ~~in~~ which all of the material <sup>is</sup> ~~which forms~~ the groove is taken out by a clean cut in the form of chips or shavings, and such cutting action becomes none the less



a cutting action, because the tool which is normally designed to cut or engrave has become dulled or otherwise inoperative, so as to imperfectly perform its function.

XQ 37. Do you make any distinction between a cutting action where the material removed adheres to the cutting style, and such an action where the material removed falls away freely from the cutting style?

A. The question as to whether or not the material falls away freely from the cutting style, is to my mind wholly distinct from the question as to whether or not the action of the style is or is not a cutting ~~man~~ one. As a matter of fact, there have been forms of record in which the cutting style of the patent in suit was employed, where the shavings were sometimes inclined to adhere more or less to the surface of the cylinder, and doubtless somewhat around the style itself, without in any way interfering with the cutting action of the style. The essential feature, so far as the cut or engraved record is concerned, is that the material must be wholly and bodily removed from the groove by the cutting action of the style, and it is immaterial what becomes of the material after it is thus removed from the groove.

XQ 38. Referring to lines 75 to 80 of page 6, what do you understand to be the objects for which cutting or engraving is employed, which objects the patentees claim that displacement of material is not calculated to accomplish?



A. In order to constitute a perfect sound record the undulatory groove must be capable of imparting to the diaphragm of a reproducer, all of the vibrations which occurred in the diaphragm of the recorder and none other. And to impart such vibrations without imparting any other or additional vibrations is the object of every sound record. The cut or engraved record will accomplish this object; the record formed by the displacement of material is not calculated to, and does not, accomplish this object; First, because it does not in itself contain undulations accurately corresponding to the vibrations of the sound waves; and second, because it contains certain cracks and roughness of surface which impart to the diaphragm of the reproducer vibrations which did not occur in the diaphragm of the recorder, and which had no corresponding vibrations in the original sound. These are the objects referred to by the lines which you have mentioned, and these are the reasons why one is calculated to perform these objects and the other is not .

XQ 39. I call your attention to claim 7, one of the claims which the defendants ~~sustain~~ are claimed to have infringed. Do you understand that the tablet described in that claim is limited to a tablet formed of a solid body?

A. I do.

XQ 40. I ask you that same question in regard to claims 8, 10, 17 and 18 of patent 341,214, and claim 37 of patent 341,288?

A. All of the claims mentioned, as I understand them,



a record tablet of solid material, that is, the material is neither liquid or gaseous.

XQ 41. Do you understand that the tablet described in claims 7, 8 and 17, of patent 341,214, is meant a tablet composed of wax or a waxlike material.

A. A tablet composed of wax or waxlike material, would be a specific illustration of the solid material contemplated by claims 7, 8 and 17, but I do not regard these claims as by any means limited to a record material that is wax or waxlike.

XQ 42. Are you familiar with the testimony given in the two cases brought by the same complainant against the same defendant, and also against the Edison Phonograph Works, in this court?

A. I have examined parts of the testimony in the cases referred to, but should hesitate to say that I was thoroughly familiar with all of it.

XQ 43. I would call your attention to XQ 18 and 19 and answers of the deposition of Arthur S. Browne, in which he states in his opinion the invention of claim 1 of the patent is limited to cutting the record in a waxlike material or one equivalent thereto. Do you, or do you not, agree with his opinion in this matter?

A. That would depend entirely upon how broad a scope is to be given to the expression "or one equivalent thereto".

XQ 44. Do you consider that these claims cover a sound record cut in a tablet of metal, say copper, for instance?



A. Never having seen a sound record cut in metal or, more specifically, in copper, I would not undertake to state whether or not the copper or the metal would act as the equivalent of the wax or waxlike composition required in the patent.

XQ 45. Do I understand you to construe these claims as covering only a record cut in a wax or waxlike tablet, or an equivalent for such a tablet, and not to cover records cut in tablets of solid bodies not equivalent to wax or waxlike substance?

A. I regard the claims viz., 7, 6 and 17, as defining a sound record cut ~~xxxxx~~ or engraved in ~~xxxxx~~ solid material. The patent has pointed out certain advantages which are to be secured by thus cutting or engraving the record groove, and any material ~~xxxxx~~ in which it is possible to cut or engrave a record groove and still retain the advantages due to the cutting or engraving action as such advantages are pointed out in the specification of the patent, would, in my opinion, fall within the terms of these claims .

XQ 46. In your judgment, how far does the patent point out and limit the method by which such record as described in these claims, is to be engraved or cut?

A. On page 1, lines 15 to 19, the patent states that

"The invention consists, first, in the formation of the record or 'phonogram', as it has been called, by means of a cutting style which is vibrated by the sound waves or sonorous vibrations to be recorded."

This is a broad statement of the invention which does



not undertake to limit the same to any record ~~material~~ material whatever. In fact, this statement of invention does not even mention a record material, it being evidently left ~~as~~ a necessary inference that some material should be provided upon which the cutting style could act as such. Having thus broadly stated that the invention consisted in the formation of a record by means of a cutting style; the patent then proceeds to state as a second branch of the invention that the invention consists in cutting the record in a waxy or amorphous and slightly cohesive substance, preferably a compound of beeswax and paraffine. The patentees have then thus far stated that their invention consisted in cutting the record and they have stated the particular characteristic of the solid material in which it is to be cut, and have given an example of such material, viz. a compound of beeswax and paraffine; but because they have given such an example, and thereby complied with the conditions of the law which requires them to state the best means known to them for carrying their invention into effect, it by no means follows, as I understand the matter, that they are therefore limited to the specific solid body, viz. the beeswax and paraffine, which they have mentioned as the one which they prefer.

The patent therefore defines distinctly the method to be employed in engraving or cutting the record, directing that it shall be done by means of a cutting style which is to be vibrated by the sound waves or sonorous vibrations to be recorded, the cutting style to act upon a solid body



ves a compound of beeswax and paraffine as an illustration or example of a solid body which may be employed in conjunction with the cutting style. Having done this, I think the patentees have clearly and distinctly defined the method of procedure which they follow to secure a cut or engraved record upon a solid body.

XQ 47. In your study of the art of recording and reproducing sounds, have you familiarized yourself with the laws of acoustics?

A. I have a general knowledge of the laws of acoustics.

XQ 48. Have you considered the question as to how far the elevations and depressions in the bottom of a sound record, made as described in the patent in question, correspond with the sound waves which form the record. If so, please state your conclusions in the matter and your reasons for them.

A. I have given some consideration to the question which you suggest, and have reached the conclusion that while the invention of the patent in suit produces a sound groove whose undulations and depressions correspond with marvelous accuracy to the recorded sound waves, there is nevertheless room for improvement, or perhaps, to state it in another way, such correspondence is not absolutely perfect. It is well known by all those familiar with the art, that the reproductions obtained from <sup>many of</sup> the sound records of the graphophone, which is the commercial name of the instrument manufactured under the patent 341,214 in suit,



are not equal in volume to the sounds originally recorded, and that the peculiar characteristic of sounds, designated as "quality" in the science of acoustics, is sometimes quite imperfect, but while this is the case the imperfections, if such they may be designated, ~~skill~~ are not such as to prevent the reproductions from being perfectly intelligible, nor from in most instances affording reproductions which reach a very fair degree of perfection as to quality.

I might ~~very accurately~~ liken the sound obtained by a reproduction in the graphophone to that which comes through a speaking tube from a person speaking at a distance. The volume of the speaker's voice is ~~necessarily~~ largely diminished, and the quality of the voice is somewhat imperfect *distinguish* but still is such as to enable ~~one~~ to perfectly ~~recognize~~ the voice of one speaker from another. This is also true of the reproductions from <sup>many of</sup> the commercial graphophone records made in accordance with the patents in suit.

XQ 49 Do you consider that the sound records made in the manner indicated by the patent in question are practically correct representations of the sound waves, and if not, please state in what particulars they are deficient?

A. The question as to whether or not a record is a practically correct representation of the original sound waves, can best be determined by reproducing such record. Assuming that the reproducing apparatus in no way detracts from the perfection of the reproduction, the deficiencies of the reproduced sound may be fairly assumed to be the deficiencies of the sound record itself. A record that, ~~is~~ ~~making~~



when reproduced, gives forth sounds of less volume than the sounds originally recorded, or that gives forth sounds lacking in quality, or varying in quality from the original sounds, is to just that extent lacking as <sup>a</sup> "correct representation of the sound waves"; ~~and yet in the practical affairs of life, such~~ ~~purpose~~ and yet in the practical affairs of life, such record with its diminished volume and imperfect quality may nevertheless be employed to great advantage, so that practically, that is, in practical affairs, the records may be said to be correct representations of the acoustic vibrations of the recorded sounds.

XQ 50. Please compare the correctness of sound records made by cutting, by displacing, and by indenting, giving their relative degree of correctness and the reasons for your conclusions. In this question I use the word "indenting" in the sense used by you in your direct examination in your reference to Edison's tinfoil phonograph.

A. In connection with the Edison tinfoil record I used the word "indented" as the equivalent of the word "embossed", and in that respect quite agree with Mr. Vansize, defendant's expert herein, who states that the "indentations" in the metal foil were embossed. Returning now to the direct point of your question, I would preface my answer by stating that so far as I am aware, no record worthy of the name has ever been made by simply displacing the material, that is, a record from which reproductions could be obtained, so that as to the displacement method of forming a record, I would state, that the method is an



utterly impracticable one. The method of forming a sound record by indenting a metal foil or other surface, as described by Mr. Edison in his patent 200,521, among others, possesses a certain scientific interest because it was by the use of this method that Mr. Edison was enabled for the first time in the history of the scientific world to demonstrate ~~xxxxx~~ strate that sounds could be recorded and reproduced. But such record was nothing more than a scientific toy, without any practical or commercial value whatever, and after the natural interest which such a remarkable scientific achievement excited, it soon ~~xxxxxxxx~~ passed from public notice. This was true not only in this country, but abroad. In a publication entitled Engineering, a weekly journal published *more than two years after the issue of the patent in suit* in London, England, and in the issue of September 14th, 1883, I find the following very fair statement of the interest that was excited by ~~the~~ <sup>the</sup> Edison phonograph at the time it was originally produced in 1877, its failure to meet the expectations which it aroused, and the further statement of the great improvement which resulted from cutting or engraving the record in wax or a waxlike tablet. The article referred to is in part as follows:

#### ENGRAVING SOUNDS.

Towards the close of 1877, the public mind, which, for twelve months previously, had been fairly overwhelmed with the discoveries of scientific investigators, was again excited by the announcement that Mr. T. A. Edison had discovered a method of mechanically reproducing speech by means of an instrument which could record and afterwards repeat messages spoken into it. Under the name of the phonograph this most ingenious apparatus speedily became familiar to everyone, and during the Paris Exposition of 1878, it in common with the telephone, ranked among



the principal attractions. With the profound and simple faith that was so prevalent at that time in all which emanated from Mr. Edison's laboratory, a great and useful future was predicted for the invention. Unfortunately, events did not justify this sanguine forecast; the phonograph quickly descended to the level of a scientific toy, the ~~monopoly~~ monopoly of which had been acquired by an enterprising London firm. X X X Since that time until recently, we have heard but little of the phonograph; but some few months ago it was confidently stated that the great inventor, having now more leisure on his hands, had again turned his attention to his old speaking machine, and that very soon the world would be startled with a new phonograph which would find a use almost as universal as the telephone. In due time the new phonograph arrived in this country, and the wonderful ingenuity which has been displayed in perfecting it, as well as the clearness and precision with which it reproduced spoken records, appeared to justify the claims in part, if not in all, that had been made for it. Instead of the phonogram being indented upon a sheet of tinfoil that had been cemented upon a spirally grooved drum traversing upon a screw, the record was engraved upon a small and compact cylinder of paper covered with a film of wax."

*it was alleged*

*was about to*

This new phonograph which Mr. Edison ~~produce~~ <sup>was about to</sup> produce was

none other than the graphophone shown, described and claimed in the patent to Bell and Tainter, 341,214 in suit, and as I have before stated, the article very correctly defines the *it and the old tin foil phonograph.* distinction between ~~the two~~, The indented tinfoil phonograph had descended to the level of a scientific toy. It had failed to justify the sanguine expectations which it had aroused. On the other hand, the graphophone, ~~which Mr. Edison is said to have produced~~, wherein the record was cut and engraved upon a small and compact cylinder of paper covered with a film of wax, that is, the invention covered by the patent here in suit, gave reproductions with a clearness and a precision such as to excite the greatest admiration.



In other words, the Edison indented or embossed tinfoil record was a practical <sup>failure</sup> ~~thing~~. An abandoned experiment which had been laid on the shelf for ten years, whereas the record cut in wax or waxlike material was at once recognized as one of wonderful accuracy and precision, and it excited an interest which for the last fifteen years has been constant and unabating, each year showing a largely increased number of such records made and sold. I find also in the Electrical World of November 12, 1877, being but a few months after the issue of the patent in suit, an interview with Mr. Edison in which he is represented as holding substantially the same opinions as those expressed in the quotation from the Engineering Journal, <sup>and</sup> in which Mr. Edison refers to his indented tinfoil phonograph as "my old toy of ten years ago", in which he says that "you had to yell into the thing and the reproduction of conversation was often something of a caricature of the original." Further, he says that "while I did not produce a commercial machine I made a very interesting and creditable attempt". He further states, that "no one but an expert could get anything intelligible back from it", and "I myself doubted whether I should ever see a perfect phonograph, and I dropped the phonograph and went to work upon <sup>the</sup> electric light."

Then occurs this sentence:

"Eight months ago I begun laboratory work upon it again, and a month ago I stopped because I could see no further improvement to be made. It is a finished machine - simple, cheap, effective, not liable to get out of order, and it does everything that I ever hoped a perfected phonograph might do."



In this last clause which I have quoted, it will be observed, that Mr. Edison does not state that he had brought the phonograph to such a degree of perfection that he could see no further improvement to be made, but simply says that he stopped because he could see no further improvement, and he then paid this very high compliment to the graphophone, or, as he calls it, phonograph: "It does everything that I ever hoped the perfected phonograph might do."

Comparing then the cut, the indented and the displaced records, I should say that I know of no displaced records made purely by displacement, that the indented record was at best only of scientific value and commercially a failure, and that the cut record was the first practical record that the world had ever seen and was recognized not only abroad, but in this country, and by Mr. Edison himself, as a wellnigh perfect machine. Without going into the reasons why the tinfoil record was a failure, I will briefly state that it was due first, to the fact that the action of the style indenting the tinfoil necessarily mutilated that portion of the record that had immediately preceded the style, and that therefore a correct record was not secured in the first place; Second, when in the act of reproducing from the imperfect record thus obtained, the tinfoil yielded to the action of the reproducer, the indentations or undulations of the record were defaced or ironed out to a large extent, and that therefore the record failed to impart to the diaphragm of the reproducer ~~the vibrations~~ even those vibrations which had been imperfectly recorded.



p. 116 2nd line change thing to  
failure

The reason why the record made by cutting was a commercial success, lay in the fact that by forming a record in this manner we are enabled to ~~secure~~ secure undulations which conform substantially to the vibrations of the sound waves, so that in the first place we secure a substantially perfect record. Furthermore, the record is formed in a material which is ~~able~~ to and does offer sufficient resistance to compel the diaphragm of the reproducer to vibrate in substantial imitation of the recording diaphragm, and therefore to reproduce the sounds which set such recording diaphragm in vibration; and in my opinion, the fact that the record when first obtained was a correct one, and was of such a character that it could be used to accurately actuate the reproducing diaphragm, is the true reason of its great commercial success.

Q. 51. In your answer to the last question, you have not clearly distinguished the question of the accuracy of a record from the question of its capacity to reproduce the recorded sounds; please supplement the answer already given by a statement of your opinion as to the respective merits of the three said methods ~~which~~ as means of accurately recording sounds, giving your reasons for your conclusions.

A. In my answer to the last question I have spoken of a sound record as meaning one formed in material offering sufficient resistance to the reproducing style to actuate the diaphragm attached thereto. I now understand that you used the word "record" in your present question in a sense broad enough to include the graphic or merely visual



record of the Scott phonautograph. With this interpretation of the word "record", and having in mind solely the production of a record without any question as to its successful reproduction, I would conceive it quite possible to make a very accurate <sup>phonautographic</sup> record of the sound waves, and such record might be though it would not necessarily be a record made by displacement. Such record would undoubtedly have the advantage of offering very slight resistance to the action of the recording style, and such resistance as was offered would be substantially uniform, but it must be borne in mind that the only value of a sound record in the art of recording and reproducing sounds, lies in the ability of such record to actuate the diaphragm of the reproducer, and <sup>because of its inability to do this,</sup> ~~for this reason~~ the merely visual phonautographic record made by displacing, is an utterly valueless one in and of itself. I am well aware of the fact that such records have been employed in the manner described by Gros in his French patent 126,213 as a means whereby a record may be formed in solid resisting material, which is then used to actuate the reproducing diaphragm. The steps, however, which are necessary to transform this non-resisting phonautographic record into ~~the~~ a record of in hard resisting material, are of such a character as to ~~introduce~~ introduce grave inaccuracies and errors into the resisting record thus produced. The records now employed in the <sup>Berliner</sup> gramophone, <sup>old</sup> ordinarily ~~shown~~ on the market, are made substantially in this way, and the ~~the~~ harsh character of the reproductions secured therefrom, and the exceedingly poor "quality"



of such reproductions clearly attest the presence of such inaccuracies. Briefly stated, these <sup>Berliner</sup> gramophone records are obtained by first tracing a phonautographic record in a thin film of wax on the surface of a metal plate. Where the metal is thus exposed acid is applied which eats out the metal plate. ~~xxxxxx~~ This metal plate is then used as a means of securing a die in relief which is employed to stamp the surface of hard <sup>rubber</sup> plates. It is apparent that no matter how accurate the original phonautographic tracing in the wax film may be, the action of the acid of itself introduces opportunities for deviation from such record. The larger undulations corresponding to sound waves in such record ~~are represented by about the one one-hundredth~~ <sup>have an amplitude of but a small fractional part</sup> of an inch, and the smaller or finer undulations which im-  
reproduced sounds  
part to the ~~xxxxxx~~ that characteristic which we call "quality" are very much finer. The acid in its action upon the metal plate is liable to act unevenly; that is, it may eat sideways into the groove at one point more rapidly than it does at another, and even if this irregularity in the action of the acid is but of the most minute character, it would to a large extent destroy those finer undulations upon which "quality" depends. This irregular action of the acid may be due to the lack of absolute homo<sup>geneity</sup> of the metal itself. The metal plate having been etched in depression, it is next necessary to secure a plate in which the groove in the original metal plate is represented by a ridge or record in relief upon another metal plate. This again introduces opportunities for deviations from the



original phonautographic record. A die having been thus prepared, it is employed to stamp the surface of the hard rubber disks, thus forming therein the record groove which is to be employed in the actual act of reproducing the sounds. This final step introduces still further opportunities for departure from the original phonautographic record.

I am aware that in thus pointing out the causes for the failure of the gramophone records to produce a successful sound record that I am departing somewhat from the scope of your question, but I have done so to emphasize the fact that before any of the records made by displacing the material can be transformed into a record which can be used in the act of reproducing sound, it must necessarily go through a number of steps, every one of which affords opportunity for introduction of errors and a departure from the phonautographic record originally secured; and I wish further to emphasize the fact that in the art of recording and reproducing sounds, we are dealing with such minute proportions that the slightest variation becomes a matter of serious importance.

Indented Record. The indented record is formed by embossing the material constituting the record tablet. Anyone can soon convince himself that when a style rests upon the surface of tinfoil or paraffine paper, and acts thereupon so as to depress the same into an underlying groove that the tinfoil or paraffine paper will be deformed or displaced not only at the immediate point of contact of the style therewith, but for a considerable distance



around such point of contact; The tinfoil or paraffine paper being depressed on both sides, to the front, and to the rear of the style. This being the case, when the style is in the act of forming a record and has, we will assume, already formed certain undulations in response to the vibrations of the sound waves, and is in the act of forming another undulation or depression, it follows that it will necessarily deform the last preceding undulation of the record in the act of forming the one of the immediate moment. The result of this is that every one of the undulations of a tinfoil record ~~marking~~ fails to correspond accurately to the vibrations of the recorded sound waves. The tinfoil record is therefore lacking in accuracy as a record without any reference to what may result from an attempt to reproduce therefrom. Another source of inaccuracy in the tinfoil record, lies in the fact that the resistance offered by the tinfoil to the action of the style increases as the depth of the indentation increases but in a greater ratio, so that the louder the sounds ~~are~~ it is desired to record, the more imperfect the record thereof will be found; and as Mr. Edison himself stated in the passage which I have quoted from the Electrical World, *that* it was necessary to yell into the tinfoil phonograph to get anything at all out of it; it will be readily perceived that this very necessity introduced an additional cause of error.

Cut or Engraved Record. The method of forming the record by cutting or engraving the record groove in a solid



body, is a method consisting of <sup>but</sup> ~~the~~ one step and is not therefore open to the possibility of the introduction of errors at different stages in its formation, such as occur where an attempt is made to transform a phonautographic record made in non-resisting material into one in resisting material. Furthermore, any particular undulation in the record when once formed, is not exposed to any deforming action of the style while producing a succeeding undulation as ~~in the~~ is the case in the Edison indenting method. It has been supposed, and is possibly to a certain extent true, that the resistance of the material of the record tablet to the cutting action of the style increases in ~~the~~ a ratio greater than that of the depth of the groove, and if <sup>introduce</sup> such is the case, it would to that extent ~~introduce~~ a possibility of error in the formation of the sound record. Furthermore, any material, even that which is of a wax or waxlike nature, offers more or less resistance to the action of the recording style, and <sup>might</sup> ~~would~~ therefore have a tendency to introduce inaccuracies into the record when finally formed. That the record groove of the engraved record is not an absolutely perfect one, is demonstrated by the fact that when reproduced it is lacking in volume and in perfection of quality, as I have heretofore stated. But its inaccuracies go only to the extent that it cannot be said to be perfect, without destroying its usefulness as a practical commercial product; that is, like most products of the human mind, it leaves room for improvement. Whereas the indented record was so wholly lacking in the essential characteristics



of a practical device that it was an absolute commercial failure.

Adjourned to Monday Aug. 23, 1899, 11 A.M.



August 28th, 1899, 11 A.M.

Met pursuant to adjournment.

Present as before.

CROSS EXAMINATION OF MR. CAMERON CONTINUED.

XQ 52. In a cut record, does the resistance increase with the depth of the cut, and if so, in what proportion? And does this increased resistance interfere with the accuracy of the record? both theoretically and ~~practically~~ when it is used for the purpose of reproduction?

A. Undoubtedly a deep cut offers greater resistance to the action of the cutting style than a shallow cut. It has been suggested that the resistance to the action of the style is not in proportion to the depth of the cut, but whether or not this is correct I have never been able to personally demonstrate. In the act of reproduction, I am unable to see that the depth of the cut ~~would~~ or the resistance which is offered to the action of the cutting style forming the record, would have any effect one way or the other; that is, the reproducing style would act in exactly the same way in conjunction with the undulations of the groove whether such undulations offered greater or less resistance to the action of the cutting style which had formed them.

XQ 53. Do you consider that the resistance to the cutting style in a cut record, is in proportion to the amount of the material removed by the several vibrations to be compared?



A. I do not.

XQ 54. In your opinion, if the cuts formed by two vibrations, one of which would impart to a diaphragm, the cutting style attached to which was not in contact with the tablet, twice the amplitude of movement that the other would, should be compared, would the cut formed by the vibrations having double the amplitude be twice as deep as the other cut?

A. As I stated in my answer to XQ 52, it has been suggested that the depth of cut is not proportioned to the amplitude of vibration of the sound waves which they represent, and in the supposition of your question, the diaphragm would vibrate when the style is out of contact with the record with twice the amplitude in one case that it would in the other. <sup>relative proportion as to</sup> Whether such amplitude would be maintained when the cutting style was in contact with the record, would, as far as my knowledge goes, be purely a matter of theory. I am inclined to think that the cut corresponding to the greater vibrations would not be twice as deep as the one corresponding to the vibrations having but half the amplitude; but I am unable from my own investigation and experiments in the matter to state that such would really be the fact.

XQ 55. Are you familiar with the French language, or in your direct examination where you have spoken of a proper translation of certain French phrases, have you depended upon information furnished by some one else, and if so, whom?



A. I should not regard myself as a French scholar, but I have studied French and have some knowledge of the language. In my translations of the various French phrases referred to in my direct examination, I first made the translations myself from my knowledge of the language, and then verified the same by consulting several French scholars, among whom was *M. des Garmes* whose expert affidavit is given in this case in connection with the translation of the clauses referred to.

XQ 56. Do you consider a sound record cut in a solid tablet by the method of vibrating that tablet against a stationary style, as contradistinguished from the sound record formed in the manner described in the patent in suit, to be an equivalent to the sound record of the patent in suit?

A. In my opinion no such sound record as supposed by the question ever was or ever could be made. The power of sound waves is so exceedingly feeble that it would be impossible to vibrate a record tablet by the power obtained from sound waves with such accuracy as to get a continuous and direct record <sup>on</sup> ~~from~~ the tablet. It might be possible to obtain here and there a cut in the tablet but it would be impossible to obtain a continuous record which could in any possible way be utilized to reproduce the original sounds. This idea of <sup>vibrating</sup> ~~graduating~~ the tablet against a revolving disk or cutter is the one proposed in the patent to Reynolds 237,166, and is one, which so far as I am aware, never got further than the mere paper patent.



It is certain that the practical world never heard of it. Furthermore, it will appear from inspection of the patent 341,214 in suit that the invention supposed to be embodied <sup>was</sup> in the Reynolds patent ~~is~~ later in date, than that of the Bell and Tainter patent in suit .

XQ 57. Assuming that a sound record could be made in the manner indicated in the question, would you consider such a record an equivalent of the sound record of the patent?

A. Such a record would be a record in solid material. It would not, however, in my opinion, be a record which corresponds to the definition of the term "cutting" contained in lines 70 to 74, page 6 of the patent, and certainly it would not correspond to the terms of claims 7, 8 and 17, of the patent in suit, because the surface is not cut or engraved with narrow lines of irregular or varied form, nor can it be said to be in the form of an irregular groove with sloping walls.

XQ 58. Assume for the purpose of the foregoing question, that the cutting style in question is identical in character with the cutting style of the patent, except that ~~xxxxx~~ the tablet vibrates instead of the style, and the style is fixed. Do you still consider that the cutting in question would not be that described in lines 70 to 74, page 6 of the patent, and that the sound record would not be cut with narrow lines of irregular or varied form, and would not be in the form of an irregular groove with sloping walls.

A. If the style of the Bell and Tainter construc-



tion was merely substituted for the revolving disk cutter of the Reynolds patent, you would not obtain any record at all and the device would be absolutely inoperative, and I have no hesitation in saying that the imperfect cutting action which might possibly be obtained by the Reynolds patent, would not occur. The power driven disk cutter is an absolutely essential element in the Reynolds device to secure any cut at all, and even this, as I have pointed out before, would be ineffective except here and there where a particularly strong vibration might force the tablet against the cutter with sufficient force to obtain a cut or mark thereon, but not one which would be properly said to correspond or represent the sound wave which caused it.

XQ 59. In what form would the cutter of the Reynolds patent remove the material of the tablet?

A. I doubt very much whether it would remove it there at all, though ~~it~~ might possibly be a removal of material; it is more than probable, however, that it would simply hack or notch the edge of the strip presented to it forming said hack or notch by displacement of the material, shoving it to either side exactly as if a knife were drawn edge down across a piece of soft pine.

XQ 60. Would the bottoms of whatever cuts or notches were made be lower in the center than on the sides?

A. Undoubtedly, if the notch is cut in the edge of the strip the bottom of the notch would be further from the edge of the strip than the top of the notch would be.



Q 61. In Q 60, I asked this question of the difference of the levels to be between the sides of the strip and the center, that is, transversely, and not longitudinally along the strip. Will you please answer the question having that in view?

A. As a revolving disk cutter is employed, the cut on the ~~surface~~ <sup>edge</sup> of a strip would apparently be on an arc corresponding to the perimeter of the cutter, provided the strip itself were stationary; but as this strip is <sup>supposed to be</sup> vibrated to and from the cutter, and presumably does not move in a perfect right line, I would be unable to state whether or not the cuts made on the edge of the strip would be formed with their bottom straight across the strip or on the arc of a curve.

Q 62. Would the cuts in question be of varying depths measured from the normal surface of the strip?

A. As I have previously stated, in my opinion there would only be here and there a cut made on the edge of the strip, and it is quite probable that such cuts as were made might vary in depth.

Q 63. If in the Reynolds patent a cylinder of the lead soap now used commercially for round coated tablets, were substituted for the metal strip, would the disk cutter cut it (I use the word "cut" as used in the patent in suit) and what would be the form of whatever record would be made by the cutter?

A. In the absence of any statement as to how the lead soap tablet was mounted and how it was to be brought in operative relation with the revolving disk cutter,



it would be impossible to form any opinion as to what the resulting action would be.

XQ 64. In the patent in suit, in claim 7 ~~and~~ the sound record is spoken of as being cut with narrow lines; is that word used in describing the width of the lines as compared with the width of the tablet, or as compared with their own depth?

A. I should suppose from the absence of any definite statement in the specification in regard to the matter, that the word narrow means that the lines are narrow in comparison with the width of the tablet; it certainly does not mean narrow in proportion to the depth of the groove, because the depth of the groove is a varying quantity and as a matter of fact, the lines made by the style are generally much wider than they are deep. As I understand this claim the word "narrow" might very properly be omitted and still define exactly the same construction; that is, a line, generally speaking, a very narrow thing, narrow certainly in proportion to its length.

XQ 65. In answer to Q. 1, of your direct examination, you say:

"The action of sound waves is so feeble that it would be absolutely impossible for them to actuate a style so as to cause it to cut through any material as tough as or possessing the fibrous nature of paper."

Did you arrive at this conclusion from theoretical speculations, or from actual experiments?

A. I have never experimented with a cutting style in contact with paper to ascertain whether the same would



cut the same or not, and such experimentation is entirely unnecessary as I have repeatedly observed the action of the cutting style on substances of a much more brittle and less fibrous character than paper, and have found that the cutting style repeatedly pulls out even such small fibrous particles as the dust that floats in the air, and which can only be seen when a ray of sunlight falls across it.

Inasmuch as my experience has taught me that the style would not cut smoothly and accurately through such delicate fibres, I was enabled to state very positively that it would not cut through a material of the fibrous nature of paper.

XQ 66. Would not this be to some extent a question of the sharpness of the cutting style?

A. Of course a dull cutting style would not cut paper nor anything else with the readiness that a sharp one would, but under the most favorable conditions the power of sound waves is so feeble that the resistance offered by the fibrous material such as paper would absolutely forbid the formation of a record in any way resembling the vibrations of the sound waves.

XQ 67. Is the action of sound waves sufficiently strong for it to be possible for them to actuate a style so as to cause it to cut metals such as iron, copper and lead?

A. It is entirely probable that there could be sound waves powerful enough to cause a cutting style to make some impression upon a metal tablet, but sound waves due to sounds which are ordinarily recorded by the style in



the practical affairs of life, would not actuate a cutting style so as to produce upon metal such as iron, copper and lead, a continuous record of the various vibrations both weak and strong which go to make up the sounds, nor could any impression be made thereon which could be utilized so as to obtain a recognizable reproduction of the original sound.

XQ 68. In your answer to Q.4, you quote from an issue of the Electrical World, dated November 12, 1887, which paper purports to quote from the New York World newspaper, which latter paper purports to narrate an interview with Mr. Edison. Have you any knowledge as to whether this interview is authentic; and whether Mr. Edison said any of the things there imputed to him?

A. All the knowledge I have on the subject is contained in the quotation which I made in my question 4 referred to.

XQ 69. In your answer to Q.4, you state that at the date of that patent,

"Mr. Edison was still using an indenting point to indent a material preferably metallic."

In a quotation you make from the specification of the British patent No. 1644, the words occur, "sometimes the metallic surface is copper". Do you understand that this copper surface was indented?

A. I don't think there is any doubt of it whatever. Mr. Edison has stated that he indents a material; that the material is preferably metallic; that sometimes tinfoil is used upon a grooved surface, and that sometimes a thin sheet



or leaf of metal is placed upon a piece of paper having a surface of paraffine or similar material, and that sometimes the metallic surface is copper. Mr. Edison has referred to indenting the surface of the record material in forming his record. No other means of forming a record by the action of sound waves is mentioned, and I therefore have no doubt that where he says a metallic surface, sometimes copper, that he merely intends to indicate that instead of tinfoil or lead foil, that he uses a copper foil thin enough to be indented as the tinfoil was indented. His particular object in employing copper foil apparently is for the purpose of using it in forming an electro-deposition thereon, for the purpose of forming a matrix from which duplicates might be obtained..

XQ 70. In your answer to Q.4, you say,

"If the stearine employed in the Lambrigt phonograph were not softened by heat and an attempt were made to form a record thereon with a style having a bearing surface on the stearine as large as that shown in the drawing, the sound waves impinging upon the diaphragm would be entirely too weak to cause the style to form in the stearine anything more than a few disconnected impressions".

Have you made this experiment?

A. I have not.

XQ 71. In your answer to Q.4, you state that

"It was the experience of those who used the earliest form of the graphophone in which the record was cut upon a wax and paraffine tablet that successful reproductions could be obtained extending up into the hundreds."

And you also say, that you have seen and heard reproduced wax and paraffine records many times.

Can you produce any records made on that form of



A. I have no such record at present in my possession and am not sure that I could obtain one from which a large number of reproductions have been made, but

Counsel requests witness to procure such a record, if he can do so, and have it at the next hearing.

How does this style differ from the style described in the patents in suit ?

A. The darning needle filed off at an angle of forty-five degrees to the tangent of a drum, would form a style which when taken by itself might have a resemblance to the style of the patent in suit, but such style would act as a cutting or indenting style only if it were placed in the proper position to cut and <sup>a</sup> ~~the~~ tablet were provided composed of a material which was capable of being cut. It would act as an indenting style if it were placed in proper operative relation with <sup>a</sup> ~~the~~ material capable of being indented



Inasmuch as the article referred to describes a drum having grooves cut in its surface, said grooves being described as "threads" made about a twentieth of an inch<sup>apart</sup>, which is the particular kind of a drum described by Mr. Edison as the one provided in his tinfoil phonograph, and inasmuch as a drum or cylinder thus grooved could have no possible use ~~xxxx~~ if the tablet were to be cut; furthermore, in view of the entire absence of any suggestion of a cutting action, and in view of the fact that the date of this article, viz., July 27, 1878, was the date<sup>at</sup> which the greatest public interest was aroused in connection with Mr. Edison's tinfoil phonograph, I have very little hesitation in saying that the article referred to intended to describe one form of the Edison indenting tinfoil phonograph. I do not ignore the fact that the article states that the needle needs to be "chisel-shaped", and that this shape is of particular importance, but it does not state that it is important to have the needle chisel-shaped in order that it may cut readily. A fine-edged indenting style would be just as essential in certain classes of indenting machines as a sharp cutting style would be in making the engraved form of record. For example, if a blunt-edged style were employed to form the indentations, it is evident that it would be impossible for the style to form any undulation which was narrower, or, more properly speaking, finer than the edge of the style itself, and as many of the vibrations representing over ~~times~~ tones, are so fine as to be measured by the five-thousandth or ten thousandth parts of an inch, it is evident that an indenting style that would successfully



record such very minute vibrations must have an exceedingly fine edge, and this not to enable it to cut, but to enable it to indent the foil in correspondence with the sound vibrations. If the style used to indent tinfoil were ground off so as to present an angle of forty-five degrees to the tangent of the recording surface, and ~~the~~ <sup>said</sup> surface in the act of recording moved under the style so that the unrecorded surface traveled under the heel of the style towards the recording edge instead of the recorded surface moving from the edge along under the heel, it is evident that the fact that it was ~~beveled~~ off at an angle of forty-five degrees would give this style a smoother rubbing action, and the very fact that it was then ~~xxxxxxxx~~ ground to a fine edge would be calculated to do what this article claims in general terms was done, that is, produce a superior record.

XQ 73. Considering this style with the recording style of the patent in suit, taking them simply by themselves, what essential difference, if any, is there between them?

A. The patent describes the style as preferably being formed by turning off the end of a round wire so as to form the end conical, and rounding this extremity, and then grinding off one side of the wire to the axis thereof, whereas the style described in the Scientific American article merely states that a sharp point, such as a needle point, is ground off at an angle of forty-five degrees to the tangent of a drum with which it is intended to be used. This latter operation would produce a style which would not necessarily have a rounded point, and if the description were followed, it would result in a cut across the needle instead



of simply to the axis of the needle.

XQ 74. Do you consider that the different shapes of these two points so formed to be functional, considering them as cutting styles?

A. I do not. In my opinion Bell and Tainter ~~described~~ described the best form of style with which they were familiar, and the one which they preferred to employ, but in my opinion a style made by grinding off a point of a darning needle at an angle of forty-five degrees to the tangent of the surface in conjunction with which it is intended to act, would, if it were properly positioned and brought into operative relation with a tablet of wax or waxlike material, <sup>would</sup> fall within the limits of the invention set forth in the patent.

XQ 75. What would be the shape of the surface formed <sup>angle</sup> by grinding off the point of a needle at ~~anything~~ except a right angle to the axis of the needle, say forty-five degrees to the axis, for instance?

A. It would be substantially that given by a conical section of the same needle.

XQ 76. Are you familiar with the shape of the cutting surface of <sup>the</sup> a cutting style now used commercially on the graphophone, and if so, please state its shape?

A. It consists of a cylinder having the end thereof rounded or cut out at an angle to the axis of the cylinder, thereby forming a curved cutting edge which cuts a shallow groove <sup>that</sup> ~~which~~ is approximately ~~the shape of~~ the arc of a circle in cross section.



XQ 77. Would the recording stylus of the patent in suit act as an indenting style if it were placed in proper operative relation with a material capable of being indented?

A. I think it would, but my idea of the proper operative relation would be to have the record surface travel in the reversed direction <sup>for</sup> ~~from~~ indenting from that which it would travel in cutting; that is, I would have the unrecorded surface pass under the heel of the style ~~and~~ before it reached the indenting edge, if I were seeking to indent as in the Edison tinfoil phonograph, whereas, if I were intending to cut a record upon a surface of wax or waxlike material, as in the patent in suit, I should have the recorded surface move from the edge of the style out under the heel, thereby presenting the cutting edge to the material in the position to act most effectively and secure the keenest cut.

XQ 78. In your answer to Q.4, you say in regard to ~~xxxxxxxx~~ a method suggested by Mr. Edison for making duplicates,

"I regard this method, however, as involving so many steps as to be impractical in commercial affairs, and as offering so many opportunities for departures, however minute, from the actual form of the original record, as to necessarily result in a duplicate record so faulty as to be practically unintelligible when reproduced."

Have you ever ~~xxxxxxxx~~ experimented upon this method of making a duplicate?

A. I have not.

XQ 79. In your answer to XQ 4, in referring to the method of duplication described by Gros, you say,



"And a further reason why an accurate duplicate would not be produced lies in the fact that the embossing or imprinting action on a soft wire would not give an accurate copy of the lines traced by the acid in a metallic plate."

If the point in the construction named which was to bear upon the wire, cut ~~the~~ or engraved the wire, would an accurate duplicate be produced?

A. It would not, because of the fact that the minute undulations formed in the ~~hundred~~ heated wire would be altered in proportion to the same undulations as found in the master record, by reason of the contraction of the wire due to the cooling thereof. Moreover, if the wire were heated to a point to make it sufficiently soft for the recording style of the duplicating instrument to act thereon effectively, it would not be able to sustain its own weight and the result would necessarily be a deformation of the undulations, even if they could be cut therein, which I repeat could not be done.

XQ 80. If in the above supposed case the wire were cold during the operation, would a successful duplicate be produced?

A. Assuming that the master or original record were a correct record, and that the same could be positioned so as to cause a cutting style to act in relation to a sufficiently fine wire, and that the wire were backed up by an anvil or other base, it is possible that a duplicate might have been formed thereon, but in the absence of a statement in the Gros patent of the specific conditions under which the duplicating device is supposed to act, it will be



impossible to state with any degree of accuracy whether a record could or could not be cut . Inasmuch, however, as Cros specifically defines the style as resting in contact with the wire opposite a small hole in the agate constituting the anvil, it is evident that the wire would not have that backing or support against the action of the cutting style which it should have, and that therefore the style instead of cutting the wire would bend the same and the finer the wire the more <sup>certain</sup> ~~readily~~ this bending action would <sup>be to</sup> occur. Manifestly this bending action of the wire would be more readily obtained if the wire were heated, and it is for this reason that Cros proposes heating the wire by a battery or otherwise.

XQ 81. In your answer to Q.4 you refer to the construction illustrated in Fig. 59 of the British patent 1644 of Mr. Edison, and described in the specifications of that patent, and in regard to the method of duplicating there indicated, you say:

"This device, however, is wholly inoperative to produce the results specified."

In giving your reasons for that conclusion you assume, do you not, that the materials ~~in~~ which the record is formed and of which the blank tablet is composed, have the same yielding and resisting qualities?

A. I assume that they are both made of metal foil in the absence of any suggestion that they are not, inasmuch as Mr. Edison has described in this patent his records consisting of an indented metallic surface, such as tin or copper foil, and inasmuch as the only description of Figure 59



speaks of a "reindenting device" for increasing the size of the "indentations"; inasmuch as it states that one point follows the "indentations" in the master record, that is, the cylinder g<sup>3</sup>, I think it is perfectly evident that Mr. Edison is describing a record on cylinder g<sup>3</sup> indented in tin or other similar foil. In any event the description ~~which~~ even when taken with the illustration, Fig. 59, fails to disclose the idea of employing a record formed in a material offering greater resistance than the material of the tablet upon which it is proposed to form the duplicate record.

XQ 32. Metal foils differ, do they not, in their capacity to resist pressure?

A. Certainly.

XQ 33. If the foil of which the blank tablet is composed in the mechanism now under consideration is more yielding in character than the foil in which the record is formed, could the reason which you give for the inoperative-ness of the machine be still urged?

A. If the foil in which the master record was formed was heavy enough to support a lever and weight which the foil in which the duplicate was to be formed would not support, then it is possible that the device would not be absolutely inoperative; but I fail to find any suggestion in the British patent No. 1644 of 1878 in which this description and figure occurs, to the effect that two foils of different strengths are to be employed. Moreover, the very fact that a heavy foil was employed to obtain the first or master record, would enormously magnify those very diffi-



qualities which made Mr. Edison's indented tinfoil record a practical failure, and which difficulties he was entirely unable to overcome. The heavier the foil, the less readily would it respond to the indenting action of the style under the influence of the very minute and feeble sound waves, and it was necessary in order to get any record at all that to the lightest possible foil should be employed as the recording surface. Even with this surface the reproductions obtained were, as Mr. Edison stated in the interview referred to in the article from the Electrical World, from which I have heretofore quoted, mere caricatures of the original sounds, and to obtain these records it was necessary to yell into the instruments. If this was the kind of record obtained when the most favorable form of foil was used as the recording surface, it will be readily understood that any increase in the weight of the foil would result in a still more defective record, and if a record which was worse than a caricature upon the original sounds were employed as a master record, it will be apparent that the duplicates which would be obtained therefrom would be even worse.

Q. 34. If the point resting on the blank tablet were made finer than the point resting on the record, so that the amount of resisting surface under it should be less, could the reason which you give for the inoperativeness of the machine be still urged?

A. Certainly. In the first place, as I explained a while ago, the minute vibrations constituting overtones are represented by such exceedingly fine undulations



that the point resting upon the master record would of necessity have to be fine enough to follow these undulations, otherwise it would skip over and iron out the undulations without producing in the second tablet any corresponding undulation. The result would be that you start with a record which is imperfect by reason of the absence of many of the overtones, as all of the Edison tinfoil records were, and in attempting to make a duplicate or copy thereof you would eliminate what few there were.

XQ 85. Would an apparatus of this character be operative to ~~make~~ copy a record made on the cylindrical tablet described in patent 341,286 upon another blank tablet of the same character?

A. I am unable to state whether it would or not. It is quite apparent, however, that any weight which was sufficient to hold the cutting style in proper operative relation with the blank tablet, must necessarily, by reason of the great leverage, exert a ruinous pressure upon the undulations of the master record.

XQ 86. Would this "ruinous pressure" be avoided if the point resting on the master record were the ball reproducing point now used on both phonographs and graphophones, and the point resting on the blank tablet were the ordinary "jewel" cutting point now used on both those instruments?

A. I think it would, because of the great leverage.

XQ 87. Referring to Q.85, I ask that again substituting however modern soap blanks for the wax and paraffine blanks.



A. I do not conceive that the substitution of the waxlike tablet known as the lead soap tablet could make any difference in my answer, and I should therefore answer the same as to question 35.

XQ 88. In your answer to Q.4, you have discussed Figure 3 in patent No. 237,166 of C.C.Reynolds. Do I understand you to be of the opinion that under the construction of that figure the record strip H<sup>4</sup> is elastic, and that its elasticity presses it against the roller B<sup>4</sup>?

A. That is my understanding of the construction.

XQ 89. Also, are you of the opinion that the spring S<sup>4</sup> presses down the lever B<sup>3</sup> pivoted on the fulcrum formed by the pin in the standard f<sup>1</sup> with sufficient force to overcome the resistance of the pressure of H<sup>4</sup> on the roller B<sup>4</sup>, and to cause the style or point p<sup>3</sup> to press against the record on the cylinder A<sup>2</sup>?

A. I am.

XQ 90. In regard to this you say:

"It is apparent that if it is strong enough for this purpose that the spring will be strong enough to cause the point p<sup>3</sup> on the lever B<sup>3</sup> to completely eradicate the record in such yielding material as tinfoil."

If that record were cut on lead soap, such as now used, would that objection to the method indicated, still remain?

A. I would not undertake to say positively, but apparently the action would be such as to greatly damage the record made on the waxlike surface known as lead soap.

XQ 91. If for the record A<sup>2</sup> were substituted a record cut on modern soap wax, and for the point p<sup>3</sup> the



modern reproducing ball, and for the roller B4 the cutting point now used, and the balance of the structure removed and a blank lead soap cylinder placed under the cutting point B4 with its axis at right angles to the lever B3, would that indicate in a general way the construction of a duplicating apparatus that would be operative?

A. I should think it would, provided the tension of the spring 74 were so regulated as not to produce injurious pressure upon the rubbing style in contact with the master record.

XQ 92. In your answer to Q.7, you say as in regard to the prior disclosures of the record defined in claims 7 and 8, set up by the defendant, that none of them ever gave to the world "a commercially practical sound record from which intelligible speech could be reproduced". Was the apparatus shown in patent 341314 capable of giving "a commercially practical sound record"?

A. It not only was so capable of doing but actually did so do.

XQ 93. Do you know this of your own knowledge?

A. I know it as a part of the history of the art of recording and reproducing sounds only.

XQ 94. You have never seen any such record?

A. I have not.

XQ 95. Was the commercially practical sound record about which you heard of the character indicated on Figures 18 and 19 of that patent, or on Figures ~~18 and 19~~ 1 and 2?

A. It was of the general character indicated in



Figures 1 and 2, but employed a revolving cylinder instead of a revolving disk.

XQ 96. I call your attention to what you have testified in regard to claim 17 in your answer to Q.7, and ask you, what is the function in the patent in suit of the sloping walls of the record described in that claim?

A. The patent says that "the advantage of this form of record is that it forms an efficient guide to the reproducing style". (L.81-63,p.1)

XQ 97. Does the sloping walls of the record groove in the Edison tinfoil record have that same function?

A. No, sir; it did not have any such function because Edison's reproducer was rigidly clamped in position and hence could not be guided by the record.

XQ/ 98. Would not a groove with vertical walls <sup>a</sup> be as equally efficient guide for the reproducing style as a groove of equal depth with sloping walls?

A. I think not, because of the fact that the rubbing point of the reproducing style is necessarily made small enough to enter the very narrowest lines of the record groove, and in a groove formed with sloping walls as described in the patent, the reproducing style would always be necessarily centered in the groove without regard to the width or depth <sup>there</sup> of ~~the groove~~ and being thus centered it would be in the ideal operative relation with the groove. If a groove were made with vertical rather than sloping walls it would necessarily be of uniform width, that is, the groove would be as wide at a shallow part of the groove as it would be at a ~~maximum~~ deeper portion thereof; and inasmuch



as a style must be made somewhat narrower than the groove itself, it would have a tendency to at all times rattle around in a groove with vertical walls, whereas a groove with sloping walls would act to efficiently guide it to and hold it in the center of the groove.

XQ 99. In your testimony mention has been made of overtones. Please state briefly what overtones are, and their effect on the character of sound?

A. The volume of sound depends on the amplitude of the vibrations of the air particles, the pitch of the sound depends on the rate of vibration/ of said particles, and the quality of the sound, or that characteristic by which we are enabled to distinguish the tone of one instrument from another or one person's voice from another, depends upon certain minute vibrations which are superimposed upon the larger vibrations to which the sound owes its amplitude. These minute vibrations thus superimposed upon the larger vibrations are due to or constitute what are known as overtones.

XQ 100. If, in the reproduction of a record these overtones are absent to any considerable extent, what effect does that have on the character of the reproduction?

A. It would not necessarily render it unintelligible, but it would render it unnatural, and in case of musical reproductions it would ~~grossly~~ rob the reproduced sounds of all that richness and peculiar quality which distinguishes say the violin from the banjo, or a fine piano from a tin pan.



Q. 101. In your answer to Q. 1, supra in discussing Edison British patent 2009 of 1877, you refer to the knife-edge point of the indenting style. What would be the effect on tinfoil if an attempt were made to record on it with a knife-edge point set at right angles to a tangent to the surface of the cylinder on which the tinfoil is wrapped, or at right angles to the surface of a tablet on which it is placed?

A. If the foil were placed over a groove in the tablet or cylinder, as is described by Edison in all of his patents of that date, the result would be to indent the tinfoil. If, however, the tinfoil or the paper mentioned by Edison in his British patent 2009 of 1877 were first raised into a ridge, as by continuously depressing the Morse register thereon in the manner suggested by Mr. Vanzine, defendant's expert herein, and then the knife edge style were allowed to rest upon and transversely across said ridge, the style would act as an indenting tool to indent the apex of the ridge, and this would be accomplished the more readily because of the fact that the material would be unsupported immediately under the ridge, the ridge in this way producing the same effect as a groove in the cylinder or tablet. Manifestly in a case of this kind, that is, with a raised ridge, a true point could not be utilized as the indenting tool, because it could not be retained in position upon the apex of the ridge, and hence a recording style with a knife edge is employed, resting transversely across the ridge, just as Weyer had his burin



resting with its edge transversely across the wire  
upon which he proposed to form his record as described in  
his French patent No. 135,633, of March 20, 1880.

Adjourned to meet subject to agreement.



Washington, D.C.

Sept. 28th, 1899.

11 A.M.

Met pursuant to adjournment and subsequent agreement.

Present:

Philip Mauro, Esq., of counsel for Complainant.

H.W. Hayes, Esq., of counsel for Defendants.

Mr. Hayes continues cross-examination of Mr. Cameron.

X Q 102 - Does the word "engraving"<sup>as used in the patent</sup> imply a surface of any special character, and if so, please state the character of a surface which it necessarily<sup>must</sup> possess in order to be engraved?

A - I do not think that the word engraving necessarily implies any particular character of surface, though I think it does ~~not~~ necessarily imply that the material to be engraved is of such character as to render the engraving action possible. Broadly speaking it must be a solid material and the patent, in line 10 of page 1, expressly mentions that the invention relates to the formation "in a solid substance" of a sound-record.

X Q 103 - Can you describe the character which a substance must have in order to be capable of being engraved ~~and~~ ~~more~~ more definitely than by saying simply that it must be a solid substance? If so, please do so.

A - The patent in suit No. 341,214, states that the invention consists, firstly, and broadly, in the formation of



a record by the action of a cutting style which is vibrated by the sound waves to be recorded. Without specifying any particular character of material in which the record is to be cut or engraved further than to state that it is a "solid" substance. I do not understand therefore that the patent is limited to any particular substance. In my opinion, however, it is necessary that the substance should be such as to enable the cutting style, when actuated by the weak force due to sound-waves, to cut or engrave the surface; and on the other hand, the substance should possess such cohesion or solidity as to enable it to actuate a reproducing style in reproducing the recorded sounds. While the patent does not, in the broad statement of the invention, place any limit to the particular solid substance which is employed, it does mention one substance which it deems particularly applicable for the purpose, viz, a wax or wax-like material, and under the second statement of invention the patent states that the invention consists in engraving or cutting the record in a waxy or amorphous and slightly cohesive substance. We have here a specific indication of certain characteristics which render the waxy substance peculiarly valuable as one in which to form a sound record.

Being amorphous it permits the cutting style to remove the material from the record groove in exact accordance with the vibrations of the cutting style, whereas if it were of a crystalline nature the chips or shavings would be liable to be removed from the groove along the line of ~~the~~ cleavage of the crystals, or if it were of a fibrous nature the fibres would offer unequal resistance to the action of the cutting style and the style would have a tendency to pull the fibres from the substance of the tablet rather than cut the same, which would result in a rough surface giving forth harsh and undesirable noises on the reproduction. But while the patent thus points out <sup>that</sup> a waxy material is by reason of its amorphous



and slightly cohesive character peculiarly adapted for the formation of a sound record by the engraving process, I do not understand that ~~that~~<sup>it is</sup> meant thereby indicate that these characteristics are absolutely essential. The patentees merely describe the best substance ~~wh~~ with which they are familiar for use in connection with the engraving process.

X Q 104 - Do you consider that a record formed by the action of a cutting style vibrated by sound waves made in a crystalline or fibrous substance to be a cut or engraved record within the meaning of the patent?

A - If the record were formed by the cutting style which style acted to remove the material from the surface of the tablet in the form of chips or shavings leaving in the tablet irregularities corresponding to sound waves, then I should certainly regard such record as a cut or engraved record whether the material was amorphous, crystalline or fibrous.

X Q 105 - Do you consider that the patent is limited to a tablet formed of a material possessing such cohesion as to enable it to actuate a reproducing style in reproducing the sounds recorded on it by the action of the cutting style vibrated by sound waves?

A - Not necessarily so. For example, a substance might be of such character or degree of hardness that when in its normal condition the force due to the action of sound waves would not be sufficient to actuate a graving style so as to form a practical sound record therein; but such substance might possibly be so treated as to soften it to a point where the cutting style would readily act to remove the material from the sound groove in the form of chips or shavings, as described by the patent, and the material composing the tablet then subsequently hardened. It would seem to me quite possible that with the ~~the~~ material softened into condition for the record to be formed thereon, that it might not possess the requisite



degree of hardness to enable it to actuate the reproducing style but it would nevertheless be a solid substance with a sound record cut or engraved therein within the clear intent and meaning of the patent. Furthermore, I would regard any substance fairly coming under the term solid in which a sound record could be formed by the engraving action described in the patent as falling within the terms of the patent.

X Q 106 - Do you consider that a sound-record ~~formed~~ made in a tablet composed of paper coated with lampblack by the action of a cutting style vibrated by sound waves, to be covered by the patent in question?

A - No sir. The style in this case would not act as a cutting style to remove the material in the form of chips or shavings, and would not therefore act in the manner which the patent expressly states it means when it says cutting or engraving. The action of a style in the lamp-black on the paper surface is merely a tracing action, and not a cutting or ~~an~~ engraving action within the meaning of the patent in suit.

On page 6, lines 70 to 74, the patent very clearly defines the meaning of the term cutting. It says -

"The term 'cutting' is herein employed to indicate an action in which the ~~the~~ material is removed in chips, shavings, or other small pieces - as in engraving, turning, and the like - and not simply displace d."

This is not the action of a tracing style in a coating of lamp-black, for while particles of lamp-black might possible be knocked off or removed from the surface of the paper, nevertheless the general action is that of displacing ~~the~~ or shoving the material to one side in order to expose the surface of the paper along the traced line.

X Q 107 - If, in a tablet formed by a coating of lamp-black on paper, the thickness of the coating of lamp-black should be greater than the ~~depth of the~~ amplitude of the



widest vibration of the cutting style vibrated by sound waves, would not the style in such case remove the material in small pieces within the meaning of the patent?

A - I cannot see how the thickness of the coating of lamp-black would produce any material alteration in the conditions as proposed by your X Q 106. The action of the style would, so far as I can see, be the same whether the thickness of the lamp-black coating was less than, equal to, or exceeded the greatest amplitude of vibration of the style.

X Q 108 - Has a tablet made of a coating of lamp-black on paper any functional ~~an~~ difference under the patent from a tablet formed of paper with a coating of paraffine or wax, except that the paraffine or wax has greater cohesiveness than the lamp-black?

A - A record formed in lamp-black could not possibly function in combination with a reproducer so as to reproduce sound, while a record formed in wax or wax-like material will cooperate with a suitably constructed reproducer to reproduce sound. This difference is, as your question suggests, due to the cohesiveness of the wax by which it is enabled to actuate the style of the reproducer in accordance with the irregularities of the record which correspond to the recorded sound-waves, the lamp-black being wholly ~~an~~ deficient for this purpose.

X Q 108 - Am I to understand then from your answer to this last question that the difference in cohesiveness is the sole functional difference between the two characters of tablets referred to.

A - The particular reason why a wax-like material is better adapted for the formation of a sound-record by a cutting or engraving process than is the lamp-black on the paper



resides largely in the fact that the wax is more cohesive than the lamp-black. I would not care to state that cohesiveness is the sole functional difference between the two characters of tablet, though I do not now recall any other difference.

~~X Q 109 -~~

X Q 109- In your answer to X Q 105 you say that a tablet formed of a material not possessing such cohesion as to enable it to actuate a reproducing style may come within the patent because its condition might be changed by treatment. Do you consider a tablet formed of ~~lampblack~~ paper coated with lamp-black which does not possess such cohesion as to enable it to actuate a reproducing style to come within the patent, assuming that by no treatment could the lamp-black be so hardened as to enable it to actuate a reproducing style?

A - I do not. I am unable to perceive how a sound-record could be cut or engraved in a lam-blackened surface within the meaning of those terms as they are employed in the patent.

X Q 110 - Do you have ~~this~~ this same opinion in regard to ~~tablets~~ records made on tablets which have not sufficient cohesion to enable them to actuate the reproducing style, and which couldnot by any treatment be sufficiently hardened ~~for that purpose~~ to enable them to do so?

A - The reason why I do not regard a record formed in lamp-black as falling within the terms of the patent is because I do not perceive how a record could be cut or engraved therein as required by the patent. I would not like to pass an opinion in regard to other substances without knowing specifically what they were. Generally stating, however,



any substance in which the cutting style must ~~act~~ would act to remove the material in the form of chips or shavings would fall within the terms "solid substance" as employed in the patent.

X Q 111 - ~~XXXXXXXX~~ You do not consider, then, that the capacity of the record to actuate a reproducing style, either in the condition in which it is when the record is made, or after subsequent treatment, <sup>say</sup> hardening, is an essential ~~XXXXXX~~ characteristic of the record described in the patent, and would be earlier use of such a record in anticipation of the record described in the patent?

A - The patent requires that the substance within which the record is formed shall be a "solid" substance, and to my mind the reason for this is that such substance is adapted to actuate the reproducing style in the act of reproduction, and any record cut or engraved in a solid material which record was able to actuate a reproducing style so as to reproduce the recorded sounds, if prior in date to the date of the invention described in the patent in suit, would anticipate the same, and the fact that such record received any treatment subsequent to the cutting or engraving action does not appear to me to be material.

X Q 112 - My question in regard to the kind of record covered by the patent, and as to possible anticipations, was directed exclusively to a record that could not actuate a reproducing style. Will you please answer it with that in mind?

A - In my opinion such a record would not fall within the terms of the patent ~~in~~ in suit. Furthermore it would not be a sound-record as this term ~~was~~ <sup>is</sup> employed in the art of recording and reproducing sound.



X Q 113 - In your answer to Q.4 of your direct examination you ~~ask~~ say in speaking of the record used by Mr. Berliner consisting of a metal plate covered with beeswax or paraffine that the wax coating is a "non-resisting medium". In what way, if any does this tablet differ functionally from the tablet of the patent consisting of paper coated with beeswax or paraffine?

A - It differs from the tablet of the patent in suit in that the coating of paraffine or wax upon the metal surface is so soft that it would be impossible to cut or engrave a record therein by the action of a cutting or a graving style.

Berliner obtained his wax coating by dissolving the wax or paraffine in a suitable solvent which was poured over the face of the metal tablet, the solvent then being permitted to evaporate and leave an exceedingly thin and delicate film upon the metal surface in which the style of the recorder traced a zig-zag or laterally sinuous record exactly as the style of the Scott phonautograph traced the zig-zag record in the lamp-black. In order to enable a tracing style to perform its office with sufficient accuracy it is necessary to reduce the resistance of the material in which the record is traced to a minimum. The sound-record could not be cut or engraved in the waxy film of the berliner patent, nor could the phonautographic record which Berliner obtained in this film be "traced" in the wax-like surface of the Bell and Tainter patent No. 341,214 in suit.

X Q 114- Is there any functional difference between the Berliner tablet referred to and the tablet of the patent beyond the hardness or cohesiveness of the wax-like coating ?

A - If counsel will pardon me, I would suggest that there is a material difference between hardness and cohesiveness. One of the requisi reasons why Bell and Tainter employ



wax or wax-like material as a suitable one for a recording tablet is because it is "slightly cohesive". I think there is an essential difference between the wax-like coating which Berliner employs and the wax tablet of the patent in suit in that Berliner seeks to make his wax film as thin as possible and at the same time have it preserve its function of insulating the ~~tablet surface of~~ metallic surface from the action of the etching acid; whereas in the wax tablet of the patent in suit there is no limit to the thickness further than that it must be thick enough to enable the style to penetrate to a depth equal to the amplitude of the greatest vibrations.

The real distinction between the wax-like surface employed by Berliner <sup>the one employed</sup> and/by Bell and Tainter in the patent in suit lies in the fact that the function of the wax in the Berliner method was to insulate the plate from the action of the etching acid, the metal plate itself being the material in which the record was to be formed, whereas in the Bell and Tainter method the wax itself constitutes the material within which the sound record was formed.

X Q 115 - In your answer to Q. 7 you refer to claim 37 of the Tainter patent No. 341,283, in which the recording tablet is spoken of as a hollow cylinder provided with a wax or wax-like coating. Do you consider that the tablet put in evidence by the Complainant, and marked as Complainant's Duplicate Exhibit Defendants/Sound Record, is an equivalent of the recording tablet described in this claim?

A - I do. The ~~cylindrical~~ tablet of this exhibit is in the form of a hollow cylinder. It has a wax or wax-like coating or surface and it has a sound-record cut in said coating or surface as may be readily demonstrated by placing the same on a graphophone in combination with a reproducer.

X Q 116 - You consider then, that so long as the coating of the tablet is wax or wax-like, it comes within ~~the~~



the language of this claim regardless of whether the body of the tablet is or is not wax-like in character?

A - Yesssir, the claim does not limit the construction to any particular material which may compose the body of the cylinder, the essential requirement being that the coating or surface of the tablet shall be wax or wax-like.

X Q 117- Is this tablet referred to in the foregoing question, in your opinion, an equivalent of the tablet described in claim 13 of patent No. 341,214?

A - Claim 13 of the Bell and Tainter patent No. 341,214 is as follows : -

"13. A tablet or body for recording sound vibrations, consisting of a paper or paste board foundation and a surface coating of bees-wax and paraffine compound, substantially as described."

This is not an exact equivalent of the tablet defined in claim 37 of the Tainter patent No. 341,288, first, because said claim 37 is specifically limited to a cylindrical tablet, whereas claim 13 of patent No. 341,214 may be of any form.

Furthermore, claim 37 is not limited to any particular material constituting the body of the cylinder, but only specifies that the surface coating shall be wax or wax-like, whereas claim 13 of patent No. 341,214 is specifically limited to a paper or paste board foundation and to a specific form of wax-like coating, viz . a compound of bees-wax and paraffine.

X Q 118 - Has the material of the foundation of the tablet described in claim 13 of patent No. 341,214, any functional importance in the patent?

A - Yes sir, it serves as the support for the surface coating of bees-wax and paraffine.

X Q 119 - In the foregoing question I meant to refer to the functional importance of that material as distinguished



from other materials for such foundation, as for instance, beeswax and paraffine or other wax-like materials. Please answer the question with that in view?

A - The paper or pasteboard foundation forms the substantial body of the tablet in one instance, whereas the substantial body of the tablet in the other case is formed of the wax-like material. To this extent their function is the same.

There is, how ever, a good many points in which they differ such as cheapness, ease of manufacture, durability, and the like.

X Q 120 - Do you regard the tablet of Complainants Exhibit Defendants Sound Record as an equivalent of the tablet described in claim 13 of patent No. 341,214?

A - Broadly speaking, Complainant's Exhibit Defendants Sound Record, and the tablet defined in claim 13 of the patent in suit are the same, that is, they each possess a wax or wax-like recording surface. Specifically, however, they are different. Complainant's Exhibit Defendants Sound Record does not have a paper or pasteboard foundation, and would not therefore infringe claim 13.

X Q 121 - In your answer to question 11 in your direct examination you referred to the classifications of the Patent Office. By what officer or officers are the classifications of that character established?

A. Up to within a short time such classification has been determined upon by the experts of the patent Office in charge of the particular classes to which the classification relates, the classification being established by the consent and approval of the Commissioner. There has, however, been recently established a classification division in the patent Office whose special duty it is to determine the classification of all the patents in the office. -161



X Q 122. Do you know what officer or officers adopted <sup>refer</sup> the classification of the "Talking Machine" art to which you ~~refer~~ in your answer to the above question.

A. I do not know of my own personal knowledge, further than that the classification was established long prior to the creation of the present classification division and would, therefore, according to the then prevalent method of classifying ~~xxxxx~~ have been the work of the Patent Office expert having Talking Machines under his special supervision.

X Q 123. Your knowledge in regard to this classification comes, does it not, from an inspection by you of the records of the Patent Office?

A. Yes sir the records and the published classification.

~~XXXXXX~~., Defendants Counsel objects to so much of the witness' testimony as refers to the record and published documents of the Patent Office on the ground that his statements is not the best evidence.

X Q 124. In your answer to question 13 of your direct examination you say that more than 2 00 patents in relation to talking machines have been taken out since the issue of the patent in suit. How did you get this information?

A. By counting the patents

X Q 125. In counting these patents did you notice their titles and if so, can you state as to whether their titles



refer to phonographs or graphophones?

A. Some of them ~~referred~~ were entitled as improvements in graphophones and some of them as improvements in phonographs. I would state, however, that a graphophone as such is a talking machine having a record cut or engraved in a solid tablet preferably of wax or wax-like material, and that not infrequently in the art the term "phonograph" is improperly applied to instruments which would more properly come under the term "graphophone".

X Q 125. Can you give any estimate as to how many of these later patents to which you refer designate the machine improvements upon which they purport to cover as a phonograph and how many designated as graphophones?

A. I could not.

X Q 126. In your answer to question 14 of your direct examination, you make a statement in regard to the way in which the patent Office experts regard the invention claimed by Bell & Tainter. From what source do you derive that information?

A. My information was partially acquired ~~from~~ through my intercourse with the patent office experts in the talking machine art, but more particularly from the statement in the Commissioner's Report which I quoted in my answer to said question 14.

X Q 127. Who was this Commissioner?

A. John S. Seymour.



X Q 128. In your answer to question 4 in your direct examination you refer to a method of making duplicates suggested by Mr. Edison consisting of electroplating to obtain a matrix of steel which could be hardened and used for impressed softer metal. You criticized that plan and say that it involves so many steps as to be impracticable. Please compare that method with the one described in ~~xxxxxx~~ Tainter patent 341,287 and state whether this latter patent does not contain as many steps.

A. The method suggested by Mr. Edison involves four steps, first the formation of the original record; second, electroplating; third, hardening the electroplate; and fourth, impressing a sheet or roller of softer metal. The Tainter described in patent 341,287 calls for three steps. First, the cutting of the original record; second, electroplating the same; and third, cutting the duplicate record. Of course the minor step such as the preparation of the tablet in which the ~~xxx~~ duplicate record is to be formed, and the building up of the backing of the electroplate, are not included in this statement of the steps of the processes as they are substantially the same in both and are necessarily included in the statement of the other steps.

X Q 129. In referring to Mr. Edison's method you say that it involves so many steps as to be impracticable in commercial affairs and as offering so many opportunities for departures, however minute, from the actual form of the original record, as to necessarily result in a duplicate record so faulty as to be practically unintelligible when reproduced. Does this criticism also apply to the method described for making a duplicate in the Tainter patent 341,287?



A. Not to the same extent that it does in the method proposed by Mr. Edison. I have heretofore pointed out that it is impossible by means of the invented method to secure a practically accurate record of the sounds to be recorded, whereas by the engraving method of the Bell & Tainter patent in suit, which the method employed by Mr. Tainter in his duplicating patent 341,287, a very accurate record is obtained. To start with then, Mr. Edison ~~xxxx~~ had a defective and Mr. Tainter a practically perfect ~~xxxx~~ record. Furthermore, while the particular embodiment of his inventive idea specifically described by Mr. Tainter in his patent 341,287 called for the step of electroplating the original record, the invention was not limited to this specific embodiment of the invention, which consisted broadly in utilizing one tablet having a record formed therein to actuate a cutting style in operative relation with a blank tablet and thereby cut a duplicate record in said blank, and this without regard to whether the original tablet or the duplicate tablet was composed of metal or not. As a matter of fact, the method described by Mr. Tainter and defined in claim 14 of his patent 341,287 is in daily practice in the commercial art and is, I believe, the only one that is practiced to any extent in the manufacture of duplicate sound records; and in this commercial practice of the Tainter invention, there are but two steps, viz., the formation of the original record, and the utilization of this record in the act of cutting the duplicate.

Another important reason why the duplicate formed by "impressing" the duplicate in a softer metal, would offer greater opportunities for error and departure from the original than would occur in the Tainter method, arises from the fact that any attempt to form a sound record by the mere displacing of the material can never be as accurate as that which necessarily results in ~~xxx~~ a defective record; whereas a record which is

165.



cut or engraved is substantially free from inaccuracies. That the duplicate formed by the Tainter method is for all practical purposes, as good as the original, is demonstrated by the fact very few experts can tell whether a record is an original or a duplicate merely by hearing the same reproduced.

X Q 130. ~~In~~ Please note that in my last question I referred not to the method of making duplicates claimed generally in the Tainter patent, but to the machine specially described in that patent, and also that my question did not refer to the character of the original record to be copied but merely as to the practicability of making an accurate copy. Bearing this in mind, please state how far ~~in~~ your criticism of the Edison method as involving so many steps and as offering so many opportunities for <sup>minute</sup> departures from the <sup>actual</sup> ~~xxxxx~~ form of the original record, is applicable to the Tainter machine.

A. It is applicable only in so far as Tainter suggests the electroplating of the original record as one of the steps in the process. Any inaccuracies might be due to electroplating would arise in the Tainter machine as well as in the Edison process. Otherwise, my criticisms of the Edison process would not apply to the Tainter process even when embodied in the particular machine to which the question refers.

X Q 131. You would consider that the machine <sup>specially</sup> described in this patent shows a ~~practical~~ commercial method of making duplicate records and is the electrical method of reproduction described in that patent a commercially practical method?

A. The method of reproduction described in that patent is one to which I have given no particular attention and I would not undertake to state that it was or was not commercial.



cially practicable. I have not, however, any knowledge of the commercial practice of the method. Whether the machine exactly as described in the patent is a commercial practicable one or not I do not know. The principles involved, however, in the method in which this machine is an embodiment, are commercially practicable and are in daily commercial use.

~~X-Q 132. I call your attention to the Graphophone No.~~  
~~206,468, type A T,~~



Washington, D.C.

Sept. 29th, 1899.

10 A.M.

Met pursuant to adjournment.

Present:

Parties as before.

Mr. Hayes continues cross-examination of  
Mr. Cameron.

X Q 132 - I call your attention to the graphophone No. 206,468, Type A 7, and also to the answer of Mr. Vansize to Q.9. of his direct examination in which he calls attention to various features of merit embodied in the aforesaid apparatus, and states that many of them are shown, described and claimed in various letters patent of the United States to T.A. Edison. I ask you to examine the apparatus and the ~~answer~~ answer to that question, and state whether in your opinion Mr. Vansize is correct in his statement in that answer and in cases where you do not agree with his statements please state your reasons for differing from him?

Objected to by Complainant's Counsel as not proper cross-examination and as not germane to any issue in this cause. The machine referred to in the question is not before the Court for the purpose of determining what inventions or patents are embodied therein. Furthermore, the question whether or not inventions of the/said patents of Edison are employed in the said machine are not at issue in this cause and testimony relating thereto is so manifestly improper that Complainant's counsel has ignored that portion of Mr.



Vansize 's deposition which is referred to in the question. Furthermore, to answer the question would necessitate on the part of the witness a careful study of each patent in connection with the prior art pertinent thereto and the witness has not been employed by Complainant, or called or examined for any such purpose. Complainant's Counsel must therefore refuse to offer any testimony upon the questions proposed until such questions arise in a case properly presenting them.

For these reasons the witness is instructed not to answer the question.

X Q 133 - I again call your attention to the apparatus referred to in the preceding question which is marked "Defendant's Exhibit Modern Graphophone, S.D.O. Ex. Dec.29, 1898", and ask you whether you find that the mandrel or cylinder of that apparatus to receive the record tablet has a tapering surface, and if so whether that feature is shown, described and claimed in letters patent of the United States No. 386,974 to T.A.Edison, dated July 31st, 1888, offered as an exhibit in this case and marked "Defendant's Exhibit Edison patent No. 386,974, S.D.O. Ex. Dec .29, 1898" ?

Complainant's Counsel objects to the first branch of the question as immaterial and irrelevant, and to the second branch for the reasons stated in objection to X Q 132, if the question is intended to ask the opinion of the witness as to the subject-matter, scope and novelty of the patent referred to .

If it is intended merely to ask what the drawings of the patent show and the specification describes, it is objected to because the patent itself is in



evidence and is the best and only admissible evidence of its contents.

A - The mandrel of the Machine Defendant's Exhibit Modern Graphophone has a slightly tapering surface, and the patent to Edison No. 386,974, states, line 563, page 2, that th

~~"this phonogram cylinder is made hollow~~

"The cylinder is made slightly tapering, for a purpose which will be presently explained"

W and on page 5, line 10, I find the following :

"As has been frequently stated, the phonogram cylinder is slightly tapering. This is also true of the bore of ~~is also~~ the phonogram blanks P which are constructed of a cylinder r, of some hard material and covered with a recording surface, s, of wax or a wax-like substance."

The mandrel shown in Fig.3 of the drawings of the said Edison patent is a tapering one, being of slightly less diameter at the right hand end than it is at the left hand end.

X Q 134 - Please answer the foregoing question, applying it to the following features of the apparatus and to the descriptions and diagrams of the following U.S. Letters patent of Mr. Edison. The ~~Edison~~ record tablet with a ~~tapering~~ tapering bore; patent No. 382,418.

The record blank having having throughout the same coefficient of expansion and moulded with a tapering bore; patent No. 382,462.

The cast record tablet with a tapering bore having internal ribs or projections; patent No. 414,761.

The record tablet consisting of a metallic soap; patent No. 430,274.

The recording diaphragm and the reproducing diaphragm of glass; patent No. 400,646.

The recording point with a cutting edge so located as to engage the surface of the tablet at an acute angle; patent No. 393,967.



68  
The same device last above described; patent No. 393,938.

The cutting point having a curved edge which cuts the record in the arc of a circle and the reproducing point in the shape of a ball; patent No. 430,278.

The cutting tool and reproducing tool both of glass; patent No. 484,583.

The tablet and a jewel or rounded jewel not affected by chemicals; patent No. 484,584.

In answering this question please consider the above referred to features of the apparatus in question and the descriptions and diagrams of the respective patents and state whether the said features are in whole or in part described or shown in the respective patents?

Same objection as to previous question, and the witness is instructed to confine his answer to what he finds in the specifications and drawings of the patents referred to.

A - Patent No. 382,418 describes a record tablet cylindrical in form, made of wax or a wax-like substance and having a tapering bore.

Patent No. 382,462 states that Mr. Edison has found in practice that the most available surface for phonogram blanks and phonograms is one composed of wax, gum or other plastic hydrocarbon, but that such compounds contract and expand under various degrees of temperature to a greater extent than paper and other similar substances and that this introduces an objection when paper and the like are used as a foundation, though under ordinary conditions the wax or wax-like surface may not be injured by this difference in the coefficient of expansion. The patent further states that the object Mr. Edison had in view is to produce a phonogram blank or phonogram which will have a wax or wax-like surface and will not be subject to the objection of the differences in the coefficient of expansion and that he accomplishes this object by construct-



ing said blank or phonogram wholly of wax or wax-like material.

Preferably he mould the entire blank of one wax-like compound but states that he may construct the base or backing of the surface of a somewhat different mixture of wax or wax-like material than that of which the surface is made.

Patent No. 414, 761, shows and describes cylindrical blanks for receiving sound records made of wax or wax-like material, said blanks having internal ribs or projections.

patent No. 430,274, describes a phonogram blank made of metallic soap which compounds Mr. Edison says are preferred ~~is~~ because of their superior amorphous quality .

Patent No. 400,646 describes a diaphragm for a recorder or reproducer made of glass or porcelain, which Mr. Edison says he has found to have advantages over mica which had theretofore been used by him. 393,968

Patents Nos. 393,967/393,968 show and describe a recording point "arranged to act more or less obliquely to the recording surface" .

Patent No. 430,278 shows and describes a cutting point having a curved edge which cuts the record groove having a cross-sectional outline in the arc of a circle. It also shows and describes a reproducing point in the shape of a ball or the portion of a sphere.

Patent No. 484,583 shows and describes a cutting tool, but not a reproducing tool, made of sapphire and not of glass as stated in your question.

Patent No. 484,584, shows a rounded reproducing tool or reproducing point, composed of a "jewel" such as sapphire, quartz or garnet, operating in connection with a tablet of wax-like material.

The record tablet of the apparatus referred to in your question has a slightly tapering bore ~~xxxxxx~~ such as described in patent No. 382,418 and said bore has internal ribs or projections described in patent No. 414,761, but whether or not the



said tablet has the same coefficient of expansion throughout that is described in patent No. 382,462, I cannot say; nor can I state that it consists of a metallic soap as described in patent No. 430,274. The recording and reproducing diaphragms appear to be of glass as stated in patent No. 400,646, but I would not state positively that such is the fact. The recording point appears to engage the surface at an oblique angle as stated in patent No. 393,967 and 393,968. The cutting point appears to have a curved edge, but not in the arc of a circle as described in patent No. 430,278. I am unable to state whether the cutting tool and reproducing tool are of glass, a jewel, or just what substance they are composed of.

~~X Q 135~~

Cross-examination closed.

Counsel for Complainant offers in evidence the following exhibits referred to in the deposition of the witness :

"Complainant's Exhibit Tainter Patent No. 341,287."

"Complainant's Exhibit Edison Patent No. 382,412."

"Complainants Exhibit Berliner Patent No. 372,786."  
Edison

"Complainants Exhibit/Patent No. 484,583 "

"Complainants Exhibit Edison patent No. 484,584".

"Complainants Exhibit Certificate of Addition Weyher French Patent".

"Complainants Exhibit Cameron Wooden Model".

Certificate of Magistrate waived.



Washington, D.C.

Sept. 29th, 1899.

Met pursuant to agreement.

Defendant's Counsel states that he has obtained from the Clerk of the United States Circuit Court for the Northern District of Illinois, a certified copy of the depositions used in the cases of the American Graphophone Company vs. The Western Phonograph Company and W. C. Backof, and has been furnished through the courtesy of the counsel for the complainant with copies of the records and briefs in the case of American Graphophone Company vs. Walcutt & Leeds, and that from an examination of these said depositions and record and briefs is satisfied that none of the following points was raised in either case or presented to the Court:

1. Whether the complainant's patents 341,214 and 341,288 cover a sound record made otherwise than by the action of sound waves/contemporaneously vibrating a cutting style.

2. Whether an unrestricted sale by complainant on its license of the record tablets described in claim 13 of ~~of~~ said patent 341,214 and claims 1, 2, 3 and 4 of said patent 341,288 licenses such purchaser under said patents to cut copies of sound/records upon them in the general manner shown by the apparatus used by the defendant and shown in Complainant's Exhibit, Sketch of Defendant's Duplicating Apparatus.

3. Whether the copy of sound record made by defendant and introduced in evidence by the complainant is a "sound record" within the meaning of the said patents as not being a record made directly by the action of sound waves.



X Q 68. Please examine the said depositions, record and briefs, and state whether it appears from them that any of the foregoing points ~~are~~<sup>were</sup> specifically presented to the court in any of these cases, and if, in your opinion, it does so appear, please point out the passages in the depositions, record~~s~~ and briefs upon which you base such opinion.

A. I have examined the papers as requested and will consider the points in the order stated.

1. The question whether complainant's patent, No. 341,-214 covers a sound-record made otherwise than by the action of sound-waves contemporaneously vibrating a cutting style was distinctly involved in the cases referred to and in every case where the infringement complained of was a duplicate sound-record. This was necessarily the case since all the duplicate sound-records which have been enjoined, were made in the same manner, and by means similar to those employed by the present defendants.

If you mean to inquire whether in either of the cases, counsel for defendants argued that the claims sued on, which are for articles of manufacture having certain described characteristics, are limited to a particular process of making such article, I am glad to say in justice to the counsel defending those cases, that they did not make any such argument to my knowledge.

2. The question whether the unrestricted sale by complainant and its licensees of blank-tablets licenses a purchaser thereof to manufacture duplicate sound-records, was also distinctly and directly involved in both these cases, and in every case where the infringement complained of was the manufacture of duplicate records, since, with the exception of a few blanks made by Cleveland Walcutt, the unlicensed manufac-



turers of duplicate records have always employed, in <sup>a</sup>the manufacture, blanks made by complainant or its licensee.

I do not find, anywhere in said papers, the proposition that the purchaser of a blank acquires by his purchase a license under this patent to manufacture a sound record by the use of unlicensed instrumentalities. The same proposition was advanced in the Walcutt case in respect of machines employed in making duplicate records, but not in respect of blanks. The argument appears in defendant's brief beginning at the last paragraph of page 7, and continuing through page 8, where the well-known case of Holliday v. Matheson is quoted.

5. The question whether the sound-record made by defendants is a "sound-record" within the meaning of the patents as not being a record made directly by the action of sound waves, is virtually a restatement of your first proposition, and I repeat that, in all the litigation upon this patent, wherein, some of the ablest patent lawyers of the country have been employed adversely to the patents, no one has ever before contended that the claims sued on only covered the sound-record defined thereby when made by the direct action of sound-waves, and did not cover identically the same sound-record made without the direct or immediate action of sound-waves. Inasmuch as every conceivable defense possessing a shadow of merit has, at one time or another, been raised against this patent and disposed of, the only explanation I can offer for the failure of counsel heretofore to raise this proposition is that they were occupied with contentions that were at least debatable and did not squarely dispute a well-settled principle of patent law, namely, that a claim for an article or product covers the defined article or product how-



ever made,

Defendant's counsel offers in evidence depositions in the cases of The American Graphophone Co. vs. Jones and the Western Phonograph Co., and it is marked "Defendant's Exhibit, Depositions in Western Phonograph Co. Case R. L. Ex. Sept. 29, 1899".

Defendant's counsel also offers in evidence record and briefs in case American Graphophone Co. vs. Walcutt & Leeds and they are marked "Defendant's Exhibit, Record and Briefs Walcutt & Leeds case, R. L. Ex. Sept. 29, 1899".

CROSS-EXAMINATION CLOSED.



CIRCUIT COURT OF THE UNITED STATES,  
District of New Jersey.

AMERICAN GRAPHOPHONE COMPANY

- vs. -

In Equity on Patents  
No. 341,214, 341,288.

U. S. PHONOGRAPH COMPANY.

Depositions in former suits introduced by stipulation  
as part of Complainant's rebuttal evidence.

From the New Jersey case:

1. Charles S. Tainter, pp. 57-71; 245-279;  
555-584.
2. Andrew Devine, 112-124.
3. Edward D. Easton, 125-143.

From Leeds & Baldwin case:

4. Thomas H. MacDonald, 70-85.
5. Charles S. Tainter, 184-202.



UNITED STATES CIRCUIT COURT.

District of New Jersey.

-----	:	
American Graphophone Company,	:	
Plaintiff,	:	
vs.	:	In Equity.
	:	4004
United States Phonograph Company,	:	
et als.,	:	
Defendants.	:	
-----	:	

EDWARD D. EASTON, recalled.

On September 6th, 1899, at the office of the President of the American Graphophone Company, the parties to the above entitled cause, by their respective solicitors, met for the taking of further testimony on behalf of the complainant.

Present: Philip Mauro, Esq., for the Complainant;  
Howard W. Hayes, Esq., for the defendants.

Edward D. Easton, a witness produced by the complainant, and who has already been sworn as a witness in this cause, deposes and says, in answer to interrogatories by counsel for the respective parties, as follows:

Direct Examination.

By Mr. Mauro:

1. Q. Are you the same Edward D. Easton who has already been sworn as a witness in this cause and given testimony herein for the defendants?

A. I am.

2. Q. Have you read an affidavit of George E. Towks-



UNITED STATES CIRCUIT COURT.

District of New Jersey.

-----: :  
American Graphophone Company, : :  
Plaintiff, : :  
vs. : : In Equity.  
United States Phonograph Company, : : 4004  
et als., Defendants. : :  
-----: :

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UNITED STATES CIRCUIT COURT.

District of New Jersey.

-----: :  
American Graphophone Company, :  
Plaintiff, :  
vs. : In Equity.  
United States Phonograph Company, : 4004  
et als., Defendants. :  
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Direct Examination.

By Mr. Mauro:

1. Q. Are you the same Edward D. Easton who has already been sworn as a witness in this cause and given testimony herein for the defendants?

A. I am.

2. Q. Have you read an affidavit of George E. Towks-



bury, entitled in this cause, and which has been introduced in evidence on behalf of the defendants, verified or bearing date May 1898?

A. I have.

3. Q. In said affidavit the following statement is made referring to a settlement of the litigation in this Court between the American Graphophone Company as Complainant, and the Edison Phonograph Works, Defendant:

"This settlement was made with the intention that the United States Phonograph Company should have the right to carry on its business undisturbed in the same manner as heretofore, and to make and sell records, both original and duplicate, as theretofore, without interference from the plaintiffs' patents."

And also the following statement:

"It was my understanding and that of everyone connected with the litigation that such an arrangement had been reached."

Please state whether or not you had any part, and if so, what part, in the settlement referred to, and also state whether or not the statements quoted in my question are correct.

A. I took an active part in the settlement in question. The statements quoted are not correct. The United States Phonograph Company was in no way a party to the settlement; no individual connected therewith appeared or was considered, nor was the Company in any way considered in the settlement. The settlement was entirely between the American



*Graphophone*  
Phonograph Company and the Edison Phonograph Works.

4. Q. Please state whether or not that settlement had any relation to articles manufactured by any concern other than the Edison Phonograph Works.

A. It had not.

5. Q. State whether or not that settlement had any relation to the manufacture of duplicate sound records, whether by the Edison Phonograph Works, or by any other concern or individual.

A. The settlement had no relation to the manufacture of duplicate sound records, nor was it claimed so to have by the Edison Phonograph Works; on the contrary, it was understood not to include duplicate sound records, which were later the subject of special negotiation, with the result that a license was issued by the American Graphophone Company to the National Phonograph Company covering duplicate sound records.

6. Q. Please state what the practice of the complainant company has been with reference to patent marks and articles manufactured and marketed by it.

A. Such articles have been uniformly marked "Patented," with the date or dates of the patents.

Counsel for complainant, under stipulation heretofore made, offers in evidence the direct testimony of this witness, given in the former suit against the United States Phonograph Company, the same to be marked "Complainant's Exhibit, Easton's Deposition".

Direct Examination Closed.



CROSS EXAMINATION.

By Mr. Hayes:

1 x Q. When was the deposition, offered in evidence, given?

A. February 13, 1896.

2 x Q. The use of the present tense, then, in that deposition, refers to that time?

A. Yes.

3 x Q. You are still president of the American Graphophone Company and the Columbia Phonograph Company?

A. I am.

4 x Q. During what periods were you in the business of being a shorthand reporter?

A. From 1872 to 1888, I think.

5 x Q. In what business did you become engaged in 1888?

A. The talking machine business.

6 x Q. Do you remember when and where you first saw an Edison Phonograph?

A. I do not remember clearly.

7 x Q. Please state, as nearly as you can, when and where you first saw one.

A. I saw the Edison Tinfoil Phonograph in Washington, but I cannot fix the date accurately.

8 x Q. When and where did you first see the Bell and Tainter Graphophone?

A. In Washington, I think on the 31st of March, 1887.

9 x Q. What type of machine was that?



A. It was a laboratory-made machine, with a tapering mandrel, and using a cylinder the recording surface of which I think was composed of some form of beeswax and paraffine.

10 x Q. What shape was the tablet?

A. Cylindrical. I should add that I also saw disks. The disk was made first, I believe, but I happened first to see the cylinder.

11 x Q. In answer to question 3 of your former deposition you speak of it as a practical machine. Does that refer to a cylindrical tablet or to a disk?

A. The machine I tested frequently had a cylindrical tablet.

12 x Q. Who showed that to you?

A. Mr. Andrew Devine, first; I think Mr. John H. White was also present, and perhaps Mr. James O. Clephane. Those three gentlemen then had charge of the machine.

13 x Q. You also state, in answer to the same question 3, that you became financially interested in it. What do you mean by "financially interested"?

A. A stock company was in process of organization, and I subscribed for and took all <sup>the</sup> stock they would give me.

14 x Q. What company was that?

A. The American Graphophone Company.

15 x Q. In answer to question 4, describing the differences between the original phonograph and the graphophone, you speak of ~~an~~ Edison Tinfoil Phonograph. Did you ever see or examine an early Edison phonograph using a recording material other than tinfoil?



A. No, not early in the sense of preceding the graphophone. I saw many such after the graphophone. I do not understand that such a machine existed. I never heard of it.

16 x Q. In answer to question 10 you state that there was one method of recording and reproducing sounds at the time you gave this deposition.

A. One practical method.

17 x Q. At that time were not sounds recorded by displacing material of the tablet, and afterwards making the record permanent by etching, and from that form reproducing the sound?

A. I think no such method was then in use for the purpose of accurately reproducing sounds, and I think not for practical purposes.

18 x Q. Was your knowledge at that time of the talking machine sufficient to enable you to speak positively about that?

A. I think so.

19 x Q. In answer to question 14 you speak of graphophones being in practical use by shorthand reporters. Do you know whether any such machines are now in use in this country for that purpose? By "such machines" I refer to graphophones now manufactured by the complainant.

A. Many such are in use by shorthand writers.

20 x Q. Can you give the names and addresses of any shorthand writers at the present time using such machines?

A. By reference to records I could furnish many such names. I now recall, as conspicuous instances, the official



reporters of debates of the United States Senate and House of Representatives and the principal Court stenographers of Washington, New York, San Francisco, and other cities. I might add that graphophones have been continuously used in the United States Senate and House of Representatives in making up the official reports of Congress since the first machines were available. I give here a list of other shorthand reporters now using graphophones, including the names and addresses of those I have referred to in this answer.

see after  
p 23



21 x Q. In your answer to question 21 you speak of graphophones having a solid mandrel tapering to hold the cylinder. Are those machines now in existence?

A. Yes, I think there are some now in existence. I saw one recently.

22 x Q. Can you produce one of them?

A. I can.

23 x Q. Where is it?

A. In the factory of the American graphophone Company at Bridgeport, Conn. I think another is in the United States National Museum in Washington.

24 x Q. In answer to question 23 you say that you had at the time the deposition was given a number of records made on the cylinders referred to in the preceding questions which had been reproduced a number of times and were then nine years old. Have you any of those cylinders now?

A. I have.

25 x Q. Can you produce them?

A. I can.

26 x Q. Where are they?

A. I do not know just where they are, but I am sure they can be found; they are probably stored away in my residence. Possibly they are in Washington.

Defendant's counsel asks the witness to produce some of these cylinders at such time and place as are convenient before the closing of the testimony in the case.

Complainant's counsel states that, as a matter of accomo-



dation to defendants' counsel, he will endeavor to accede to this request, but will not undertake to do so.

27 x Q. In answer to question 25 you speak of the advantages of the use of the graphophone in the matter of dictation. I ask you whether in your business at the present time you make use of a graphophone for dictation?

A. Invariably. I have dictated in no other way since the graphophone was available. I used for that purpose the first laboratory-made machines that I could procure. I have dictated probably on every business day since the advent of the first graphophones, with the exception, of course, of times when I was away from the office, and all my dictation has been given to the graphophone -- the last within an hour.

28 x Q. In answer to question 26 you give the prices that defendants paid for their blanks at the time the deposition was given, and the prices they received after musical records had been made on them. Are the prices as given then correct for the present time, if you know? If so, please state.

A. We are making no sales of material to defendants at this time, except at catalogue prices, which are the retail prices, and therefore higher for blanks than the prices named in the answer referred to.

x 29 x Q. What are the current wholesale prices for blanks?

A. The wholesale prices of blanks vary according to the quantity purchased. The list-price of unshaved blanks is twenty cents, on which discounts as high as fifty percent are given under extraordinary circumstances; usually a lower dis-



count.

30 x Q. What are the current prices for the ordinary musical record?

A. The lowest list-price at which musical records are now sold is fifty cents, or five dollars per dozen; the highest, I think, four dollars per record.

31 x Q. What is the maximum discount given on the fifty-cent record when sold in large quantities?

A. In a very few instances, so few as to be extraordinary, I have known of a discount as great as sixty percent. The regular maximum discount to large purchasers is fifty percent.

32 x Q. In answer to question 27 you refer to correspondence between yourself and defendants' counsel, Mr. Frelinghuysen and myself. Have you copies of that correspondence?

A. I think all of the letters are already in evidence.

33 x Q. Please dictate to the stenographer that correspondence.

A. The correspondence is as follows:



New York, April 25, 1893.

Sam'l H. Bryan, Pres. Graphophone Co.,  
Washington, D. C.

Dear Sir:-

The United States Phonograph Co. of New Jersey, a client of mine, is about to commence the manufacture of Phonograph cylinders, if it can be done without bringing down upon their heads a patent litigation that they would be unable to withstand.

The early Cylinder patents owned by your company are, as I understand, outside of anything held by the North American Phonograph Co. and cylinders can be made under them without in any way infringing the North American patents.

Any information that you can give me in this regard both as to the relations of your company with the North American, and to the numbers of your patents on cylinders, will be appreciated and may lead to an arrangement mutually beneficial to your company and to the United States Co.

Yours truly,

G. G. Frelinghuysen.

Enclosure- " Apr. 26 / 93  
Ansd that E. of D will take action".



TELEGRAM.

NEWARK, N. J. May 13, /93.

E. D. EASTON

COLO. PHONO. CO. WASHN. D. C.

Will let you know Monday. Have'nt seen Mr. Hayes since.

V. H. BENJON.



May 13, 1895.

Mr. V. H. Emerson,  
United States Phono. Co.,  
Newark, N. J.

My dear Sir:-

I telegraphed you to-day asking when the license was desired and have your answer stating that you will let me know on Monday. I sent the despatch with a view of expediting matters, my understanding being that you wanted it at the earliest possible moment; and that the fixing of July 1st was simply in order to give the license longer life.

I hope to show you very soon the machine about which we talked. A specimen is due here now; and if it arrives on Monday and is all right I may bring it to New York.

Yours truly,

E. B. EASTON.



May 20, 1893

Mr. C. C. Prelinghuysen,  
No. 160 Broadway,  
New York City.

Dear Sir:-

When I left Mr. **Hayes** the form of the license as well as its substance was agreed upon between us.

After laying the matter before our Board and receiving authority to make the license on payment of the advance fee therein named, I telegraphed Mr. Emerson and asked when the license was desired. My understanding, when we parted, was that it was wanted immediately.

Mr. Emerson advises me that Mr. Hayes and yourself will answer this inquiry.

Please let us know your wishes in the matter.

Yours truly,

General Manager.



T E L E G R A M.

NEWARK, N. J. July 10.

July 10th 1893.

E. D. EASTON

Care Colo Photograph Co. Wash D. C.

Can you not give us until August 1st to pay license fee. Mr. Hayes away and I dont know where; he made no provision for the money before leaving and left unexpectedly.

V. H. EMERSON.



July 12, 1893.

Mr. V. M. Emerson,  
Manager United States Phono. Co.,  
No. 91 Orange St.,  
Newark, N. J.

Dear Sir:-

Enclosed please find copy of the license for the manufacture  
of phonograph cylinders.

Yours truly,

AMERICAN GRAPHOPHONE CO.,  
By E. D. EASTON, PRES.



TELEGRAM.

July 31, 1893.

V. H. EMERSON

91 Orange St.,

Newark, N. J.

Payment must be made at once if license is expected. Answer Washington.

E. D. HASTON.



Aug. 2, 1893,

Mr. V. H. Emerson,  
United States Phono. Co.,  
No. 51 Orange St.,  
Newark, N. J.

Dear Sir:-

Your telegram of yesterday was duly received.

We shall expect a prompt remittance, unless our negotiations are to be called off.

Yours truly,

E. D. EASTON,  
General Manager.



TELEGRAM.

NEWARK, N. J.

Aug.

1880

E. D. EASTON

Washn, D. C.

Mr. Hays returned this a.m. and I shall see him this p.m.

V. H. EMERSON.



34 x Q. Where did you meet Mr. Froelinguysen?

A. At his office in New York City, at his request.

35 x Q. Was the form of the license, which you state was agreed upon, reduced to writing?

A. Yes, it was reduced to writing.

36 x Q. Please dictate it to the stenographer.

A. It is as follows:



THIS AGREEMENT made the            day of May, 1895 between  
the AMERICAN GRAPHOPHONE COMPANY, of Washington, District  
of Columbia, party of the first part, and The United States  
Phonograph Company, of Newark, New Jersey, party of the  
second part:

WITNESSETH: That Whereas Letters Patent of the  
United States, numbers 341,214, - 341,232 for Improvements  
in Talking Machines, were duly issued and assigned to the  
said party of the first part, and:

WHEREAS The party of the second part is desirous of  
manufacturing cylinders containing said patented improve-  
ments,;

NOW THEREFOR, the parties have agreed as follows:

I. The party of the first part hereby licenses and em-  
powers the party of the second part to manufacture at their  
factory or factories in the State of New Jersey, but not  
elsewhere, during the time hereinafter specified - Phono-  
graph cylinders containing the patented improvements, and  
to sell the same within the United States.

II. The party of the second part agrees to make full  
and true returns to the party of the first part, under oath,  
upon the tenth days of Jan. and July in each year, of all  
phonograph cylinders containing the patented improvements,  
manufactured by them during the six months preceding the  
first of January and July.

III. The party of the second part agrees to pay to the  
party of the first part twenty-five cents ( 25 ¢ ) as a  
license fee, upon every phonograph cylinder manufactured .



by the said party of the second part containing said patented improvements, PROVIDED, that if the said fee be paid in advance upon the first day of any month, or otherwise paid in advance, a discount of twenty-two and one-half ( 22 1/2 ¢ ) cents per cylinder, shall be made from said fee for the use of said money and guarantee of manufacture, during the year ending June 30, 1894, and that thereafter the discount for advance payments shall be twenty-three ( 23 ¢ ) cents per cylinder.

IIII. That the said party of the second part agrees to pay as advance license fee not less than \$1,000. on or before the first day of July, 1893, and this license shall thereupon take effect and a further advance license fee of \$150.00 on or before September first, 1893, and a like sum on or before the first of each month thereafter until and including June first, 1894.

V. It is mutually understood and agreed that this license does not authorize the manufacture of cylinders for graphophones.

VI. It is mutually understood and agreed that any advance <sup>made</sup> payments shall be good and valid payments under this license until exhausted by the manufacture of cylinders by the said party of the second part.

VII. That the party of the first part may terminate the license by serving a written notice upon the party of the second part at any time that the party of the second part shall fail to make returns or to make payment of license fee, as herein provided for, thirty-days after the days herein named, said party of the second part shall not, however, be



discharged from any liability to the party of the first part  
for any license fee due at the time of the serving of said  
notice.

IN WITNESS WHEREOF the parties above named have  
hereunto set their hands this       day and year first  
above written.



37 x Q. State in a general way what this license was for.

A. In a general way, it was a license to permit the manufacture of blanks.

38 x Q. Are those blanks the tablets that are covered by the two patents in suit, 341,214, and 341,226?

A. I think so.

39 x Q. In your answer to question 38 you speak of marking the devices made by the complainant. Are the blank tablets made and sold by the complainant marked "Patented", with a reference to the patent?

A. Yes.

40 x Q. Are they marked in any other way?

A. Yes.

41 x Q. In what other way?

A. They are marked with a prohibition of their use for making duplicate sound records.

42 x Q. How long has the complainant pursued the plan of marking the blank tablets sold by it with a prohibition against the making and using of sound records?

A. I think since about June 28, 1898.

43 x Q. Have all the blank tablets made and sold by the complainant since that time down to the present time contained a prohibition against their use for making duplicate sound records thereon?

A. The blanks sold by the American Graphophone Company have been so marked.

44 x Q. In that answer do you include those blanks that were sold by the Columbia Phonograph Company, and which were



manufactured by the American Graphophone Company?

A. Yes; but the manner in which my answer is framed is intended to exclude sales of blanks after the factory packages are broken; I do not know what then takes place. The original sales are made with the blanks so marked.

45 x Q. I understand you to say, then, that all packages of blanks manufactured and sold by the American Graphophone Company, both to the Columbia Phonograph Company and others, have on the original packages a prohibition of this character?

A. Yes.

46 x Q. Can you give the exact language of this prohibition?

A. The language is as follows:

"These blanks are sold for use only with machines licensed by the American Graphophone Company, and must not be used for making duplicate sound records."

47 x Q. You speak of original packages. How many blank tablets could one of these original packages contain?

A. Usually from 125 to 150.

48 x Q. How is this notice put on a package?

A. By a printed label.

49 x Q. How is that label affixed to the package?

A. By mucilage or paste.

50 x Q. I understand, then, that this label is not attached in any way to the blank itself, but only to the outside of the box in which the blanks are originally shipped from the factory?



A. It is not attached to the blank itself; it would be difficult, if not impossible, to so attach it.

51 x Q. Can you produce one of these labels?

A. I produce the label.

Defendants' counsel offers in evidence the label produced by witness, to be marked "Defendants' Exhibit Complainant's Label, September 6, 1899."

These blanks are sold for use only with machines licensed by the American Graphophone Company, and must not be used for making duplicate sound-records.

52 x Q. Mr. Easton, your information in regard to the use of this label since June, 1898, is derived from other persons, is it not, and is not a matter within your own personal knowledge?

A. It is not a matter of my personal knowledge.

53 x Q. From whom have you received this information?

A. I received information as to the approximate date of the printing of the label from the manager of our printing office, which is located in our factory at Bridgeport, Connecticut; and as to the label, from the factory manager and the executive officer.

54 x Q. Would the factory manager be able to testify of his own knowledge as to the use of this label?

A. If you mean to ask whether he could say as to every package, then my answer would be no. He could testify, I think, as to the rule of the factory and to its observance, generally speaking.



55 x Q. Who have been the managers of your factory at Bridgeport, Connecticut, from June, 1898, down to the present time?

A. Mr. T. H. MacDonald only.

56 x Q. Referring back to my question as to the marking of the devices made by the American Graphophone Company, at what date were the blank tablets of that Company marked with the word "Patented" and a reference to the patent, or marking of that general character?

Complainant's counsel objects to the question as immaterial, as blank tablets are not involved in the present suit.

A. I am not able to answer accurately from memory, but I can say generally that this marking has been done for several years.

57 x Q. How has this mark been made upon or attached to the blank tablets?

A. By a printed label attached to the package.

58 x Q. Has the complainant ever pursued the plan of placing this notice on the cylinder itself, so far as you know?

A. I think not. It would be difficult, if not impossible.

59 x Q. All the tablets made by the American Graphophone Company are sold to the Columbia Phonograph Company, are they not?

A. They are.

60 x Q. Are you familiar with the business of the ~~pres-~~  
~~es~~ Columbia Phonograph Company?



A. I am.

61 x Q. In the disposal of these blank tablets by the Columbia Phonograph Company, are they sold by the Company in the original packages, or are the packages broken before they are sold to the public?

A. Almost always in the original packages.

62 x Q. Does the Columbia Phonograph Company sell these tablets throughout the United States?

A. Yes.

63 x Q. Is the Columbia Phonograph Company, of which you speak as the Company through which all the product of the American Graphophone Company is sold, the same Columbia Phonograph Company that received a contract about 1888 or 1889 from the North American Phonograph Company?

A. It is, so far as operations are concerned in Maryland, Delaware and the District of Columbia. There is more than one Columbia Phonograph Company; or rather, I should say there is a Company known as the Columbia Phonograph Company which operates in Maryland, Delaware and the District of Columbia, and another corporation, known as the Columbia Phonograph Company (general), which operates throughout the world.

64 x Q. Is the Company which takes the entire output of the American Graphophone Company the Columbia Phonograph Company operating in Maryland, Delaware, and the District of Columbia, or the Columbia Phonograph Company (general)?

A. The product of the American Graphophone Company sold in Maryland, Delaware, and the District of Columbia, is sold by the Columbia Phonograph Company; all its other pro-



duct is sold by the Columbia Phonograph Company (general), a separate corporation.

65 x Q. Under the laws of what state is the Columbia Phonograph Company (general) organized?

A. Under the laws of West Virginia.

66 x Q. And when was that Company incorporated?

A. I think in May, 1894.

67 x Q. In my subsequent questions I shall refer to the Columbia Phonograph Company operating in Maryland, Delaware, and the District of Columbia, as the Columbia Phonograph Company, and to the other Company, with a similar name, as the General Company. About when did the Columbia Phonograph Company receive a license from the North American Company?

A. I think in January, 1889.

68 x Q. Was that license first granted to you and afterwards assigned by you to that Company?

A. It was; but my recollection is that afterwards the North American Company Licensed the Columbia Phonograph Company directly.

69 x Q. Does that Company now act under that license from the North American Company?

A. It does. It paid for the license for its entire term, and has successfully maintained all its rights under that license.

70 x Q. Under what patents was that license granted? In answering this question please characterize the patents in a general way.

A. Generally speaking, all of the patents covering phonographs taken out or owned by Mr. Edison; as to grapho-



phones, the Company had such a license as the North American Phonograph Company and Jesse H. Lippincott were able to give.

71 x Q. Has the Columbia phonograph Company since that time been selling the output of the factory of the American Graphophone Company under that license?

A. The Company has been selling a portion of the output of the American Graphophone Company, but not under the license, inasmuch as the American Graphophone Company was not a party to the license.

72 x Q. Through what portions of the United States has the Columbia Phonograph Company sold, and through what portions of the United States does the Columbia Phonograph Company now sell, the articles manufactured by the Edison Phonograph Works?

A. I think only in Maryland, Delaware, and the District of Columbia.

73 x Q. Has the Columbia Phonograph Company any license from the American Graphophone Company other than the one already referred to?

A. The Columbia phonograph Company has no license from the American Graphophone Company. The Columbia Phonograph Company buys the product of the American Graphophone Company and sells it again.

74 x Q. Has the Columbia Phonograph Company any exclusive contract with the American Graphophone Company by virtue of which it alone is entitled to sell the output of the American Graphophone Company in the territory above referred to?



A. My impression is that the Columbia Phonograph Company has no contract with the American graphophone Company; I cannot recall one. I will say that there are business usages that are established by the fact that they have been followed for a long time.

75 x Q. Please state the relations between the American Graphophone Company and the Columbia Phonograph Company.

A. The American Graphophone company owns nearly all of the capital stock of the Columbia Phonograph Company.

76 x Q. Then, as I understand, all the stock of the Columbia Phonograph Company, except so much as is necessary to maintain the legal organization of the Company, is owned by the American Graphophone company?

A. That is true.

77 x Q. Does this state of affairs also apply to the Columbia phonograph Company (general)?

A. It does.

78 x Q. Then, in effect, both of these companies are simply business methods by which the American graphophone Company puts its product before the public?

A. They are separate corporations having complete <sup>corporate</sup> ~~separate~~ existence. In the division of the business at present the American Graphophone Company manufactures and the two Columbia Phonograph Companies sell.

79 x Q. Does the Graphophone Company make what are known as records?

A. Yes.

80 x Q. And I presume that those records, like the



rest of its product, are presented to the public by the two companies referred to?

A. Yes.

81 x Q. Are these records originals, or duplicates, or both?

A. Both.

82 x Q. How long has the American Graphophone Company been making duplicate records for sale to the public?

A. For many years; I cannot state exactly.

83 x Q. Can you tell whether it made duplicate records as early as 1892?

A. It did.

84 x Q. And were those made at that time sold to the public?

A. They have been so sold as long as they have been made.

85 x Q. I presume that the duplicate records first made were inferior in quality to those now produced and that the sale to the public was largely influenced, as to quantity, by the character of the duplicates that were able to be made.

A. Undoubtedly.

86 x Q. Did the Columbia Phonograph Company make duplicates in the years 1892, 1893, and 1894, for sale to the public?

A. I cannot recollect without reference to data.

87 x Q. In the testimony in the former suit between these parties reference was made to a sale of records by the Columbia Phonograph Company to Mr. Tewksbury, acting for the Kansas Phonograph Company, and also to the United States Phonograph Company, which began business in January 1894



Can you tell whether any duplicate records were sold to Mr. Tewksbury, acting for the Kansas Phonograph Company, and whether any duplicates were sold to the United States Phonograph Company?

A. I cannot tell at this time, and I doubt if I could // ascertain.

88 x Q. In your answer to cross-question 62 in your testimony in the former suit between these parties reference is made to a thousand blanks sold to the United States Phonograph Company, upon which they were to place records and return to you. Can you state whether these records so made and returned to you were originals, or duplicates, or both?

A. My recollection is that they were or ~~were~~ were to have been originals. The United States Phonograph Company at that time was making and selling original records, as I know by a visit to their premises and observation of their work on a few occasions; But I have not at this moment any independent recollection of the particular records inquired about.

89 x Q. Did the Columbia Phonograph Company deal extensively with the United States Phonograph Company prior to the commencement of litigation between them?

A. The two companies had dealings. The business was all small in those days. There were a number of transactions between the companies.

90 x Q. Did the Columbia Phonograph Company sell talking machines and supplies to the United States Phonograph Company in the year 1894?

A. Probably.

91 x Q. When you say probably, is the doubt in your

mind as to the dates, or as to whether sales of that character were made by the one company to the other?

A. I am speaking without official records, and my recollection as to dates is at this somewhat remote period not exact; but there were transactions between the companies on several dates.

92 x Q. What was the character of these transactions of which you speak?

A. I recollect sales by the Columbia Phonograph Company of musical records to the United States Phonograph Company, I think; but there is some confusion in my mind because of the fact that Mr. Tewksbury, who was the individual dealing, represented at one time the Kansas Phonograph Company, and at another time the United States Phonograph Company; possibly both companies at the same time.

93 x Q. Were those musical records of which you speak made on blanks made by the American Graphophone Company, or purchased from the Edison Phonograph Works?

A. I am unable to state, and think it would now be impossible to ascertain. The Columbia Phonograph Company bought blanks from both sources at the time of the transaction in question, if my recollection serves me rightly.

94 x Q. In your direct examination put in evidence by the complainant you give a list of persons who use the graphophone, and in answer to a cross-question you divide those names as follows: 24 persons not connected with the American Graphophone Company, 8 connected with the Company as officers or stockholders, and 2 as employees. Have you data by which you can designate which of these names are referred to in this specialization?



A. It would at this time be difficult for me to do so accurately, but I think even yet I can indicate certain of the persons named who were not connected with the company.

95 x Q. I will ask you to make this indication so far as possible, and also to give, so far as you can, the addresses of these persons mentioned in your answer to question 24. This information can be furnished by you at your convenience and added by the stenographer to his transcript of this testimony.

The information here called for follows:

① Andrew Devine, in 1896, official reporter of debates of the House of Representatives, Washington, D. C.; then and now stock holder and director of the American Graphophone Co.; 143 Broadway, New York City.

Aaron Johns, then and now shorthand reporter, Washington, D. C. Then and now stock holder.

William Herbert Smith, then shorthand reporter, Washington, D. C. and stock holder; now treasurer of the American Graphophone Co. and Columbia Phonograph Co., 143 Broadway, New York City.

Miss Ida Lewis, then and now typewriter, operator, Washington, D. C.; No connection.

Miss M. C. Clayton, typewriter operator, then an employe, now no official connection; address care of Mr. Frank Dorian, her husband.

Mr. Frank Dorian, then an employe in a minor capacity, now manager of the European Department of the Columbia Phonograph Co., Gen'l, 34 Boulevard des Italiens, Paris, France.

Miss Julia N. Camp, then a small stock holder and an employe; now married and living in Washington, D. C.. I do not recall her married name.

Mr. Jere Mc. Auliff, then an amanuensis in the House of Representatives, Washington, D. C.; no connection; I do not know his present address.

Mr. D. W. Brown, then and now an official reporter of debates of the House of Representatives, Washington, D. C.; then a stock holder; now no connection.

Mr. A. C. Welch, then and now an official reporter of the House of Representatives, Washington, D. C.; no connection.

Mr. O. P. Austin, then and now a Washington journalist; no connection.

Mr. George C. Bain, then and now a Washington journalist; no connection.

Hon. W. C. P. Breckinridge, then a member of the



House of Representatives ; now living in Kentucky; no connection.

Mr. Chapin Brown, lawyer, of Washington, D. C.; then a stock holder; now no connection.

Miss Grace Craig, typewriter operator, Washington, D. C. ; no connection.

P. V. DeGraw , then manager of the United Press, Washington, D. C. with no connection; now manager of the Philadelphia office of the Columbia Phonograph Co., 1032 Chestnut Street.

Mr. Benjamin Durfee, then Clerk of Committee on Finance, U. S. Senate and a stock holder; now same address.

Mr. Chas E. Foster, then and now patent attorney, Washington, D. C. ; no connection.

Mr. Smith D. Fry, then a Washington journalist; no connection; do not know his present address.

Mr. E. J. Gibson, then a Washington journalist; no connection; do not know his present address.

Prof. G. Brown Goode, Director National Museum; now deceased; no connection.

Mr. B. W. Hanna, then employed in one of the U. S. Departments in Washington; now Secretary of the Philadelphia Exposition; no connection.

Mr. Curtis J. Hillyer, then of Washington, D. C.; no connection; do not know his present address.

Prof. W. D. Hornaday, then of the National Museum, Washington, D. C.; no connection; now of Buffalo.

Mr. A. B. Johnson, then and now Chief Clerk of the Light House Board, Washington,, D. C.; no connection.

Mr. O. D. LaDow, then an employe of the Agricultural Department, Washington, D. C.; now employed by the National Gramophone Company, New York City; no connection.

Hon. Samuel R. Peters, then Member of Congress from Kansas; no connection; present address unknown.

Mr. E. T. Peters, then employed in the Agricultural Department, Washington, D. C.; no connection; present address unknown.

Mr. James Q. Rice, then Examiner, Patent Office, Washington, D. C.; present address, New York City; now stock holder.

Mr. Chas H. Ridenour, then and now a stock holder and a shorthand writer of Washington, D. C.

Prof. C. V. Riley, then Entomologist, Agricultural Department and possibly a stock holder; now deceased.

Prof. C. D. Walcott, then of the U. S. Geological survey; no connection; now U. S. National Museum, Washington, D. C.

Mr. E. B. Wight, then a journalist of Washington, D. C.; no connection; now deceased.

Prof. Thos. Wilson, then and now of the Smithsonian Institution, Washington, D. C. and a stock holder.

Mr. M. E. Lyle, then and now an officer of the company; present address, 143 Broadway, New York City.

Mr. H. H. Barroll, Lawyer, Chestertown, Md; Stock holder.

Mr. R. F. Cromelin, then and now an officer and stock holder; 143 Broadway, New York City.

Eugene Davis, then and now an employe of the United States Senate; no connection.



96 x Q. In your answer to question 3 of your present deposition on your direct examination you referred to a license to make duplicates, which license was granted by the complainant to the National Phonograph Company at a date subsequent to the settlement of the former litigation between the Complainant and this defendant. Do you refer to the license under patent 341,287 already introduced in evidence by the Defendant in this case?

A. Yes.

97 x Q. Between whom were the negotiations in regard to the settlement of the former litigation between the complainant and this defendant and the Edison Phonograph Works carried on?

A. I know of no negotiations for a settlement to which the defendant, the United States Phonograph Company, was a party.

98 x Q. Please answer the balance of this question which refers to the settlement with the Edison Phonograph Works.

A. The negotiations were carried on between Mr. Richard N. Dyer, for the Edison Phonograph Works, Mr. Philip Mauro for the American Graphophone Company, and myself.

99 x Q. In your answer to question 18 in your deposition in the former suit, you refer to an exhibit marked "Defendants' Exhibit Complainant's Ozokerite Blank." Is that exhibit a blank of the same character as the Ozokerite Graphophone blank introduced as an exhibit by the Complainant in this case?

A. Assuming that one was introduced, it was probably

about the same, as there was only one general type of Ozokerite blank, with some very slight variations in composition, color, &c.

RE-DIRECT EXAMINATION.

By Mr. Mauro:

1 r-d Q. Is the use of the graphophone for practical business purposes confined to shorthand writers?

A. No.

2 r-d Q. Can you state generally something of the extent of its use by others?

A. The use of the graphophone as a substitute for the human amanuensis for the purpose of receiving dictations is gaining quite rapidly, and very many more machines are in such use than when my previous deposition was given. I recall several large commercial houses in each one of which there is a plant of 30 to 50 graphophones, and the number of business houses where smaller plants are installed is large.

RE-CROSS EXAMINATION.

By Mr. Hayes:

1 r-c Q. What is the type of graphophone used by the commercial houses of which you speak?

A. principally now of type C, the latest product of our factory for commercial purposes. But many of the houses in question continuously use smaller outfits of earlier make.

2 r-c Q. What types of machines were those you refer to as outfits of earlier make?



A. Generally speaking, all the types that the American Graphophone Company has made. The use goes back many years in many cases.

3 r-c Q. What type of blank is used by the commercial houses of which you speak?

A. The latest product of our factory.

4 r-c Q. Please describe the character of that blank.

A. It is a solid blank of the same composition as that used for musical and other purposes, but it is longer and thicker.

5 r-c Q. I understand, then, that it is a hollow cylinder made entirely of one composition.

A. Yes.

6 r-c Q. In length it is about six inches; and, with the exception of its length, it is in general appearance the same as the blank at present made by the Edison Phonograph Works?

A. It resembles the blank made by the Edison Phonograph Works, except as to length and thickness.

7 r-c Q. How does it differ in thickness from the blank now made by the Edison Phonograph Works?

A. It is a little thicker. It is what is known as the Economical blank, because it can be shaved a great many ~~times~~ times, and holds a great many words.

8 r-c Q. Is this blank of the same composition as the blank manufactured by the complainant for musical records?

A. Yes.

9 r-c Q. Please state in a general way the character of the components of the composition?

A. Generally the blank contains stearic acid, ozokerite, I believe, and ceresin. I am not a practical blank-maker, and therefore cannot answer the question very accurately.

10 r-c Q. Please give the names and addresses of the commercial houses which, you state, use the graphophone largely in a commercial way.

A. I now recall Swift and Co., the meat men; their headquarters are, I believe, in Chicago, but they have houses throughout the United States; they have about fifty machines in use. Sears, Roebuck and Co., of Chicago, have about fifty. Montgomery, Ward and Co., of Chicago, have about the same number. Marshall Field and Co., of Chicago, have a large plant. J. V. Farwell and Co., of Chicago, have a large plant, as has the Westinghouse Company of Pittsburgh. To go fully into the subject would be to make a small directory of the principal cities of the United States. There are many other substantial plants whose names I cannot recall without a search of records and the expenditure of a great deal of time. Graphophones for that purpose are sold daily and numerous at many points in the United States. There are probably very many in use of which I have never heard and about which I could not conveniently learn, as the trade is so considerable. I doubt if a day passes without something on these lines.

11 r-c Q. Do you know of any such plant, as you have above described, in the State of New Jersey?

A. At the moment I do not recall one; but I should say that of late years none of these details have come necessarily under my observation, and there may be many plants in this.



state. I think we should probably not find as many as fifty  
in any one plant in New Jersey, as in that case no doubt I  
should have heard of it.

E. D. C. L.

## Certificate of Incorporation.



## STATE OF WEST VIRGINIA.

I, HENRY S. WALKER, \_\_\_\_\_, Secretary of State of the State of West Virginia, hereby certify that an agreement duly acknowledged and accompanied by the proper affidavits, has been this day delivered to me, which agreement is in the words and figures following.

THE UNDERSIGNED agree to become a corporation by the name of the

\_\_\_\_\_ AMERICAN GRAPHOPHONE COMPANY, \_\_\_\_\_

for the purpose of acquiring and exercising the exclusive right to manufacture, use and sell the patented invention known as the Graphophone and its parts and appliances within the United States and Canada, and of licensing others within said territory to make, sell and use the same, and to conduct such other rights and franchises as may be necessary or appropriate in connection therewith.

Which corporation shall keep its principal office or place of business at Washington City, District of Columbia, and is to expire on the thirteenth day of May, A. D. 1937. And for the purpose of forming the said corporation, we have subscribed the sum of Sixty thousand Dollars to the capital thereof, and have paid in on said subscriptions the sum of Six thousand Dollars; and desire the privilege of increasing the said capital by the sale of additional shares from time to time, to Six hundred thousand dollars in all.

THE CAPITAL so subscribed is divided into shares of ten (10) Dollars



each, which are held by the undersigned, respectively, as follows, that is to say:-

	NAMES.	RESIDENCE.	NO. OF SHARES.
By	Jas. H. Saville,	Washington, D. C.	1,200
"	Jas. G. Payne,	" " "	200
"	Austin Herr,	" " "	1,000
"	Jas. O. Clephane,	" " "	1,000
"	Jno. H. White,	" " "	1,000
"	Andrew Devine,	" " "	1,000
"	Nathaniel Wilson,	" " "	375
"	Jno. F. Cox,	" " "	225
			<u>6,000</u>

And the capital to be hereafter sold is to be divided into shares of the like amount.

Given under our hands, this thirteenth day of May, 1887.

James H. Saville.

James G. Payne.

Austin Herr.

Jas. O. Clephane.

Jno. H. White.

Andrew Devine.

Nathaniel Wilson.

John F. Cox.

Wherefore, The corporators named in the said agreement and who have signed the same,  
and their successors and assigns, are hereby declared to be from this date until the  
thirteenth day of May, A. D. Nineteen Hundred and  
thirty-seven, a corporation by the name and for the purposes  
set forth in said agreement.



Given under my hand and the Great Seal of the  
said State, at the City of Charleston, this fifteenth  
day of May, Eighteen Hundred and  
eighty-seven,

HENRY S. WALKER,

Secretary of State.



[TESTIMONIAL.]

STATE OF WEST VIRGINIA,

OFFICE OF SECRETARY OF STATE:

I, WM. M. O. DAWSON, \_\_\_\_\_, Secretary of State  
of the State of West Virginia, hereby certify that the foregoing writing, dated the  
\_\_\_\_\_ thirteenth \_\_\_\_\_ day of \_\_\_\_\_ May, \_\_\_\_\_, Eighteen Hundred  
and eighty-seven, \_\_\_\_\_, is a true and correct copy of the Certificate  
of Incorporation of \_\_\_\_\_  
\_\_\_\_\_ THE AMERICAN GRAPHOPHONE COMPANY, \_\_\_\_\_  
a corporation created and formed under the laws of said State, as appears from the  
Records of Corporations in my said office.



Given under my hand and the Great Seal of the  
said State, at the City of Charleston, this  
\_\_\_\_\_ eighteenth \_\_\_\_\_ day of  
\_\_\_\_\_ August, \_\_\_\_\_, Eighteen  
Hundred and Ninety-eight. \_\_\_\_\_

*Wm M O Dawson*  
Secretary of State.

# Certificate of Incorporation.



## STATE OF WEST VIRGINIA.

I, HENRY S. WALKER, Secretary of State of the State of West Virginia, hereby certify that an agreement duly acknowledged and accompanied by the proper affidavits has been this day delivered to me, which agreement is in the words and figures following:

THE UNDERSIGNED agree to become a corporation by the name of the "COLUMBIA PHONOGRAPH COMPANY" for the purpose of introducing into use, using, renting, selling and otherwise disposing of phonographs and phonograph-graphophones, and any other analogous instruments or devices for the recording and reproduction of speech, music or other sounds, and all supplies and things in any way relating thereto and used in connection therewith, and to do any other matter of thing which may be necessary and proper in the premises, in the District of Columbia, the State of Maryland and the State of Delaware.

Which corporation shall keep its principal office or place of business at Washington, District of Columbia, and is to expire on the 15th day of January, 1939. And for the purpose of forming the said corporation, we have subscribed the sum of thirty thousand Dollars to the capital thereof, and have paid in on said subscription the sum of thirty thousand Dollars, and desire the privilege of increasing the said capital by the sale of additional shares from time to time, to one



hundred and twenty-five thousand Dollars in all.

THE CAPITAL so subscribed is divided into shares of five dollars each, which are held by the undersigned respectively, as follows, that is to say:\_\_\_\_\_

By Andrew Dvine, of Washington, D. C.	500 shares,
William Walter Phelps, of Teaneck, New Jersey,	700 shares,
Wm. Herbert Smith, of Washington, D. C.	1000 shares,
Edward D. Easton, of Arcola, New Jersey,	2000 shares,
Aaron Johns, of Washington, D. C.,	500 shares,
Chapin Brown, of Washington, D. C.	625 shares,
John P. Jefferis, of West Chester, Pa.	50 shares,
Mills Dean, of Washington, D. C.	625 shares.

And the capital to be hereafter sold is to be divided into shares of the like amount.

Given under our hands, this 15th day of January, A. D. 1889.

*Andrew Dvine* ?  
Wm. Walter Phelps.

Wm. Herbert Smith.

Edward D. Easton.

Aaron Johns.

Chapin Brown.


John P. Jefferis.

Mills Dean.

Wherefore, The corporators named in the said agreement and who have signed the same,  
and their successors and assigns, are hereby declared to be from this date until the  
\_\_\_\_\_fifteenth\_\_\_\_\_ day of \_\_\_\_\_January, \_\_\_\_\_Nineteen Hundred and  
\_\_\_\_\_thirty-nine, \_\_\_\_\_, a corporation by the name and for the purposes  
set forth in said agreement.



Given under my hand and the Great Seal of the  
said State, at the City of Charleston, this twenty-second  
day of \_\_\_\_\_January, \_\_\_\_\_Eighteen Hundred and  
eighty-nine, \_\_\_\_\_

\_\_\_\_\_HENRY S. WALKER\_\_\_\_\_   
Secretary of State.



[TESTIMONIAL.]

STATE OF WEST VIRGINIA,

OFFICE OF SECRETARY OF STATE:

I, WM. M. O. DAWSON, \_\_\_\_\_, Secretary of State  
of the State of West Virginia, hereby certify that the foregoing writing, dated the  
fifteenth \_\_\_\_\_ day of January, A. D. \_\_\_\_\_, Eighteen Hundred  
and eighty-nine, \_\_\_\_\_, is a true and correct copy of the Certificate  
of Incorporation of \_\_\_\_\_

\_\_\_\_\_ COLUMBIA PHONOGRAPH COMPANY, \_\_\_\_\_

a corporation created and formed under the laws of said State, as appears from the  
Records of Corporations in my said office.

Given under my hand and the Great Seal of the

said State, at the City of Charleston, this

\_\_\_\_\_ twenty-second \_\_\_\_\_ day of

\_\_\_\_\_ August, \_\_\_\_\_, Eighteen

Hundred and Ninety-eight. \_\_\_\_\_

 \_\_\_\_\_

Secretary of State.



# Certificate of Incorporation.



## STATE OF WEST VIRGINIA.

I, W. E. CHILTON, Secretary of State of the State of West Virginia, hereby certify that an agreement duly acknowledged and accompanied by the proper affidavits, has been this day delivered to me, which agreement is in the words and figures following:

THE UNDERSIGNED agree to become a corporation by the name of  
"THE COLUMBIA PHONOGRAPH COMPANY (GENERAL)",  
 for the purpose of introducing into use, using, renting, selling and otherwise disposing of phonographs, and graphophones, and any other analogous instruments or devices for recording and reproducing speech, music or other sounds, and all supplies and things in any way relating thereto, or used in connection therewith; also typewriters, typewriter supplies, and to do any other matter or thing that may be necessary and proper in the premises, in the United States and Canada.

Which corporation shall keep its principal office or place of business at Washington, District of Columbia, and is to expire on the 15th day of May, 1943. And for the purpose of forming the said corporation, we have subscribed the sum of four thousand Dollars to the capital thereof, and have paid in on said subscriptions the sum of four thousand Dollars, and desire the privilege of increasing the said capital by the sale of additional shares from time to time, to ten thousand dollars in all.



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THE CAPITAL so subscribed is divided into shares of one hundred Dollars each, which are held by the undersigned, respectively, as follows, that is to say:-

	NAMES.	RESIDENCE.	NO. OF SHARES.
By	R. F. Cromelin,	of Washington, D. C.	Ten shares,
	Edward D. Easton,	of Washington, D. C.	Ten shares,
"	Frank Dorian,	of Washington, D. C.	five shares,
"	H. P. Godwin,	of Washington, D. C.	five shares,
	Wm. Herbert Smith,	of Washington, D. C.	Ten shares,

And the capital to be hereafter sold is to be divided into shares of like amount.

Given under our hands and seals this fourteenth day of May, A.D.

1894.

Edward D. Easton. / (Seal)

Frank Dorian, (Seal)

Wm. Herbert Smith, (Seal)

Harry P. Godwin, /Seal)

R. F. Cromelin, (Seal)

Wherefore, The corporators named in the said agreement and who have signed the same,  
and their successors and assigns, are hereby declared to be from this date until the  
fifteenth day of May, Nineteen Hundred and  
forty-three, a corporation by the name and for the purposes  
set forth in said agreement.



Given under my hand and the Great Seal of the  
said State, at the City of Charleston, this twenty-first  
day of May, Eighteen Hundred and  
ninety-four.

W.E. Chilton

Secretary of State



[TESTIMONIAL.]

# STATE OF WEST VIRGINIA.

## OFFICE OF SECRETARY OF STATE:

I, WM. M. O. DAWSON, \_\_\_\_\_, Secretary of State  
of the State of West Virginia, hereby certify that the foregoing writing, dated the  
fourteenth \_\_\_\_\_ day of May, A. D. \_\_\_\_\_, Eighteen Hundred  
and ninety-four, \_\_\_\_\_, is a true and correct copy of the Certificate  
of Incorporation of \_\_\_\_\_  
\_\_\_\_\_ THE COLUMBIAN PHONOGRAPH COMPANY, (GENERAL), \_\_\_\_\_  
a corporation created and formed under the laws of said State, as appears from the  
Records of Corporations in my said office.



Given under my hand and the Great Seal of the  
said State, at the City of Charleston, this  
\_\_\_\_\_ eighteenth \_\_\_\_\_ day of  
\_\_\_\_\_ August, \_\_\_\_\_; Eighteen  
Hundred and Ninety-eight. \_\_\_\_\_

*Wm M O Dawson,*  
Secretary of State.